BIOLOGICAL RESULTS OF THE UNIVERSITY OF MIAMI DEEP-SEA EXPEDITIONS. 108.

PYCNOGONIDA FROM THE CONTINENTAL SHELF, SLOPE, AND DEEP SEA OF THE TROPICAL ATLANTIC AND EAST PACIFIC

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ABSTRACT

Several thousands of pycnogonid specimens from 451 stations or samples, belonging to 76 species in 7 families are recorded. Of these, 23 represent new species or subspecies; moreover 1 new genus and 1 new subgenus are described. The samples studied came from the entire tropical belt of the Atlanto-East Pacific region, but mostly from the Caribbean and adjacent regions. Both shallow-water and deep-sea material is treated.

INTRODUCTION

The present report was initially based on the collections made by the R.V. JOHN ELLIOT PILLSBURY and the R.V. GERDA, of the University of Miami, Rosenstiel School of Marine and Atmospheric Science. The scope of this paper has been delimited by the geographical area covered by these two ships, i.e. the Caribbean, the Gulf of Panama, and the coast of tropical Africa. The bathymetrical range of the material collected ranges from the littoral zone into the abyssal. As far as the shallow water material is concerned, the zoogeographical term "Atlanto-East Pacific region" (Ekman, 1935, 1953) applies well to the region studied. The greater uniformity of the deep-sea fauna makes this term less applicable to the rest of the material, but for convenience, the deep-water samples will be treated in the present paper along with the shallow water material.

In a later phase, quite extensive collections from other sources, chiefly from the Caribbean and adjacent waters, sent to the author for identification, were incorporated in the present paper as well. Although most of this material came from shallow waters, several new species discovered during the PILLSBURY and GERDA cruises, turned up again in these new collections. On the other hand, they contained a considerable number of interesting and new forms not represented in the Miami collections.

The following additional collections should be mentioned specifically: the large collections of Dr. P. Wagenaar Hummelinck (Utrecht, The Netherlands), consisting mostly of very shallow water forms from a great number of Caribbean islands; the collections of Dr. M. Kempf (at the time of the Instituto Oceanográfico, Recife, Brazil), made during the SALDANHA, RECIFE, ITAMARACA, CANOPUS, and AKAROA cruises on the shelf of the tropical part of Brazil; the deep-sea collections of the Oceanographic Vessel JEAN CHARCOT, made during the cruise "Walda" in the central Atlantic (these collections have been kindly sent to me by Dr. D. Reyss, Brest); the collections made by the hydrographical Royal Dutch Navy vessels SNELLIUS and LUYMUS, off the Guyanas and on the Saba Bank, partly in the frame of the CICAR project; the shallow water collections made around Miami, by various collectors but mostly by Professor Dr. L. B. Holthuis (Leiden/Miami); the shallow water collections from Puerto Rico made by Dr. V. A. Capriles, of the Inter American University, San Germán, P.R.; the collections made the present author in holding a WOSUNA grant in the Netherlands' Antilles during 1957/58, and in 1963 in Puerto Rico on a grant of the Universities of San Juan de Puerto Rico and Mayagüez.

In total, these collections comprised several thousands of specimens, from 451 different stations or samples. Seventy-six species were represented, of which 23, almost one-third, were new to science; moreover 1 new genus and 1 new subgenus were present. These 76 species are distributed over the various families as follows:

Ammotheidae: 19 species (of which 4 new, 1 in a new genus)
Colossendeidae: 7 species (of which 2 new)
Nymphonidae: 6 species (of which 3 new)
Pallenidae: 6 species (of which 1 new)
Phoxichilidiidae: 34 species (of which 12 new, 1 new subgenus)
Pycnogonidae: 4 species (of which 1 new).

Consequently, more than 40 per cent of the species recorded belongs to the Phoxichilidiidae, which is not surprising since this family contains such predominantly tropical genera like *Anoplodactylus* and *Pallenopsis*.

The high percentage of new species in the present collections, proves that our knowledge about tropical Pycnogonida, even from relatively well-studied regions such as the Caribbean, still is rather fragmentary. It must be admitted, however, that the majority of the new species are morphologically very similar to certain forms classically recorded and that their sibling nature could be revealed only by the study of a large number of samples, containing all the various species from a wide range of localities.

I wish to thank Dr. F. M. Bayer, Rosenstiel School of Marine and Atmospheric Science, University of Miami (collections in University of Miami Marine Laboratory, UMML), for making the PILLSBURY and GERDA collections available to me. Likewise, I am indebted to the various scientists or collectors mentioned before for their Caribbean material. Furthermore, the kind assistance (chiefly involving the loan of material for comparison) is acknowledged of Drs. C. A. Child (National Museum of Natural History, Washington, D.C.—USNM); J. Forest (Muséum National d'Histoire

naturelle, Paris—MNHN); J. S. Garth (Allan Hancock Foundation, Los Angeles—AHF); P. J. van Helsdingen (Rijksmuseum van Natuurlijke Historie, Leiden—RMNH); H. W. Levi (Museum of Comparative Zoology, Cambridge, Mass.—MCZ); R. J. Lincoln (British Museum (Natural History), London—BMNH); M. Moritz (Zoologisches Musem der Humboldt Universität, Berlin—ZMB); and T. Wolff (Zoologisk Museum, Copenhagen—ZMK).

In addition to the institutions mentioned, with the abbreviations used for them, in the preceding paragraph, a considerable number of specimens has been preserved in the author's institution, the Zoölogisch Museum of the University of Amsterdam (ZMA).

NEW DATA ON THE TAXONOMY, ZOOGEOGRAPHY, AND MORPHOLOGY OF PYCNOGONIDA

The most important new facts revealed in this report can be briefly summarized as follows:

Ascorhynchus pararmatus n.sp. (hitherto confused with *A. armatus* (Wilson, 1881); the latter is re-illustrated); *Ascorhynchus castelli* (Dohrn, 1881), new to the western Atlantic; *Ascorhynchus ovicoxa* n.sp. (eggs contained in the swollen 2nd coxae); *Ammothella rugulosa* (Verrill, 1900), possibly synonymous with *A. appendiculata* (Dohrn, 1881); *Ammothella marcusi* Hedgpeth, 1948 (description completed); *Ammothella exornata* n.sp. (described); *Prototrygaeus* n. gen., for *P. ammothelloides* n.sp., a shallow water genus with characters intermediate between *Pycnofragilia, Ammothella,* and *Trygaeus*; *Colossendeis macerrima* Wilson, 1881 (morphological variability discussed; one record from very shallow waters, viz. 121-131 m); *Colossendeis melancholicus* n.sp. (a gigantic deep-water species); *Rhopalorhynchus claudus* n.sp. (from off Barbados, but closely related to certain Indo-West Pacific members of the genus); *Pantopipetta brevicauda* Stock, 1963 (first record on northern hemisphere); *Nymphon stromi* Krøyer, 1844 (range extended about 5° more southward); *Nymphon floridanum* Hedgpeth, 1948 (re-described after the types); *Nymphon aemulum* n.sp. (a sibling species of, and hitherto confused with, *N. floridanum*); *Nymphon adami* Giltay, 1937 (range extended); *Nymphon caementarum* n.sp. (cement gland pores not restricted to the femur); *Nymphon surinamense* n.sp. (first uniunguiculate *Nymphon* recorded from the Caribbean); *Callipallene emaciata* (Dohrn, 1881) (occurrence in Florida confirmed); *Pallenoides amazonica* n.sp. (a species with auxiliary claws); the genus *Pallenopsis* is transferred to the Phoxichilidiidae and subdivided in a new way into the subgenera *Pallenopsis* s.str. and *Bathypallenopsis* n. subgen.; *Pallenopsis (P.) schmitti* Hedgpeth, 1943 (first records S. of the equator); *Pallenopsis (P.) kempfi* n. sp. (another sibling species in the *fluminensis*-group); *Pallenopsis (P.) fluminensis* (morphology discussed); *Pallenopsis*

(*P.*) *meinerti* Schimkewitsch, 1930 (first record after the original find); *Pallenopsis* (*P.*) *candidoi* de Mello-Leitão, 1949 (northward extension of range); *Pallenopsis* (*P.*) *forcifer* Wilson, 1881 (southernmost record); *Pallenopsis* (*Bathypallenopsis*) *mollissima*-complex revised (holotype of *P. mollissima* [Hoek, 1881] re-examined); *P.* (*B.*) *longiseta* Turpaeva, 1957 recorded from the Gulf of Panama; *P.* (*B.*) *comosa* n.sp., *P.* (*B.*) *paramollis* n.sp., and *P.* (*B.*) *guineensis* n.sp. distinguished within the *mollissima*-complex); *Pallenopsis* (*Bathypallenopsis*) *tydemani caraibica* n.subsp. (a new race of an Indo-West Pacific deep-water form); *Pallenopsis* (*B.*) *californica* Schimkewitsch, 1893 (re-described after paratype; belongs to the *tydemani*-group); *Anoplodactylus portus* Calman, 1927 (presence of a short propodal lamina discovered; teratological chela described); *Anoplodactylus pharus* n.sp. (very tall ocular tubercle); *Anoplodactylus insignis* (Hoek, 1881) (re-described and restricted); *Anoplodactylus insigniformis* n.sp., *A. massiliformis* n.sp. and *A. simulator* n.sp. (three new species, confused in the past with *A. insignis*); *A. iuleus* n.sp. (a new name for *A. maritimus* sensu Hedgpeth, 1948, non Hodgson, 1914; the real *A. maritimus* may be a senior synonym of *A. parvus* Giltay, 1934); *Anoplodactylus petiolatus* (Krøyer, 1844) variability in Caribbean region discussed); *Anoplodactylus trispinosus* Stock, 1951 (male recorded for the first time; *A. trispinosus* from the Red Sea proves not identical with the Atlantic material and has received a new name, *Anoplodactylus turbidus*); *Anoplodactylus antillianus* n.sp. (a hermaphrodite? or a female with ovigers?); *Philyra* Losina-Losinsky, 1961 (a junior homonym for which the new name *Phoxiphilyra* is proposed); *Pycnogonum reticulatum* Hedgpeth, 1948 (variability in shape of abdomen); *Pycnogonum guyanae* n.sp. (closely related to North Atlantic *P. crassirostrum* Sars, 1888); *Pentapycnon geayi* Bouvier, 1911 (number of ♀ genital pores is 8).

Family Ammotheidae

Ascorhynchus pararmatus n. sp.

Figs. 1-2

Ascorhynchus armatus.—Hedgpeth, 1943: 49-50 (non Wilson, 1881).

Material.—Florida: 1 ♂ (holotype). GERDA Sta. 252: 27°29.5′N 78°37.5′W; 485-496 m; 5-II-1964. (USNM).—2 ♂. GERDA Sta. 158: 26°27′N 79°21′W-26°36′N 79°24′W; 540-531 m; 25-VI-1963. (ZMA).—3 ♀, 4 ♂. GERDA Sta. 234: 25°42′N 79°23′W-25°44′N 79°22′W; 452-474 m; 30-I-1964. (ZMA).—1 ♂, 1 ♀. GERDA Sta. 235: 25°44′N 79°22′W-25°46.5′N 79°22′W; 531 m; 30-I-1964. (ZMA).—1 ♂. GERDA Sta. 261: 27°20′N 79°22′W-27°24′N 79°32′W; 494-512 m; 7-II-1964. (ZMA).—2 juv. GERDA Sta. 405: 27°48′N 79°00′W-27°49′N 79°02′W; 549-522 m; 21-IX-1964. (ZMA).—1 ♀. GERDA Sta. 694: 26°28′N 78°40′W-26°27′

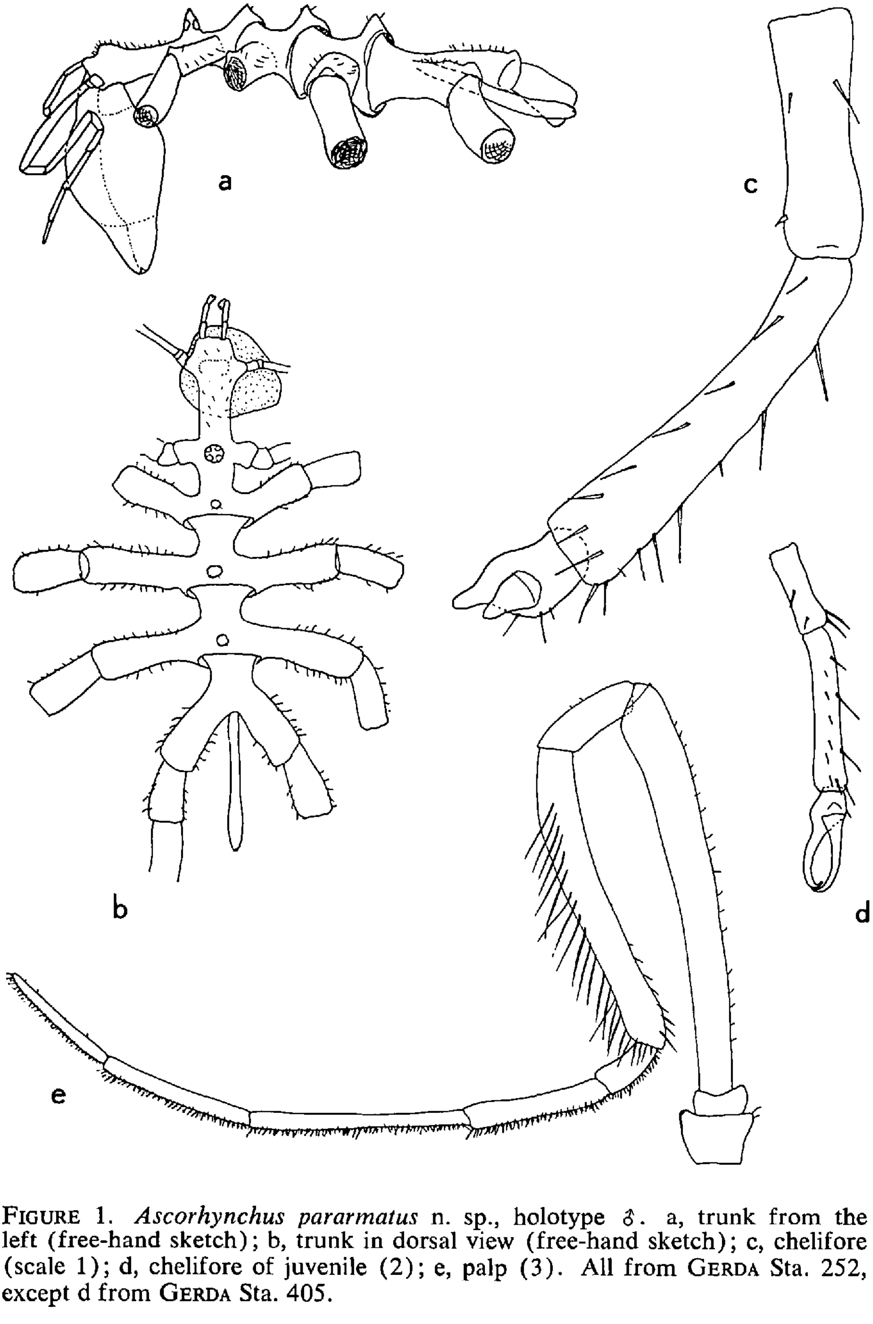

FIGURE 1. *Ascorhynchus pararmatus* n. sp., holotype ♂. a, trunk from the left (free-hand sketch); b, trunk in dorsal view (free-hand sketch); c, chelifore (scale 1); d, chelifore of juvenile (2); e, palp (3). All from GERDA Sta. 252, except d from GERDA Sta. 405.

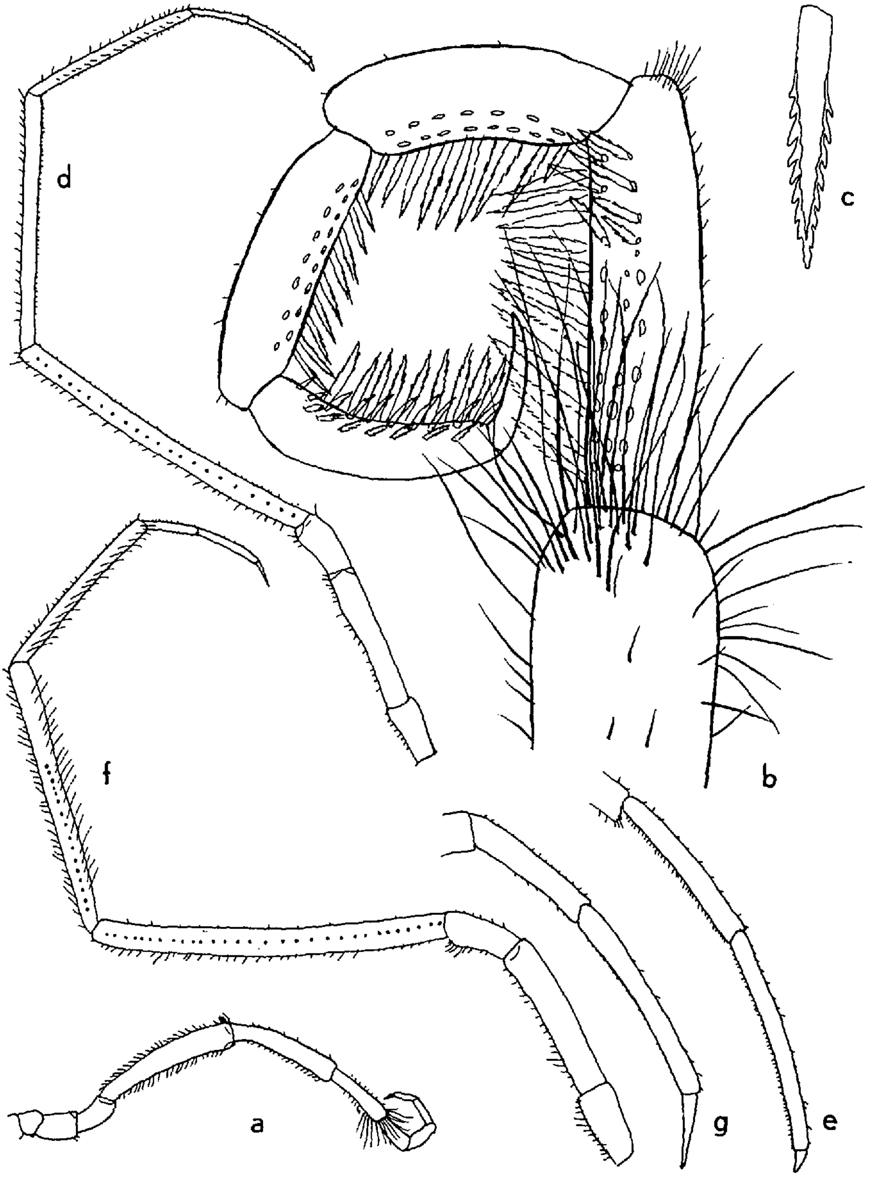

FIGURE 2. *Ascorhynchus pararmatus* n. sp., holotype ♂. a, oviger (scale 4); b, distal portion of oviger (compound spines only partially represented; bases of spines not drawn indicated by ovals) (5); c, compound spine of oviger segment 10 (6); d, first leg (4); e, distal segments of leg 1; f, third leg (4); g, distal segments of leg 3 (to the same scale as e). All from GERDA Sta. 252.

N 78°43'W; 622-695 m; 21-VII-1965. (ZMA).—2 ♀. GERDA Sta. 716: 26°08'N 79°24'W-26°11'N 79°25'W; 544 m; 3-VIII-1965. (ZMA).—2 ♂ (one of which ovig.), 2 ♀. GERDA Sta. 718: 26°08'N 79°19'W; 458-439 m; 3-VIII-1965. (UMML).—1 ♂. GERDA Sta. 719: 26°16'N 79° 14'W-26°18'N 79°14'W; 404-412 m; 3-VIII-1965. (ZMA).—2 ♂. GERDA Sta. 720: 26°22'N 79°11'W-26°23'N 79°10'W; 476-500 m; 3-VIII-1965. (ZMA).—Bahamas: 3 specimens (fragm.). ATLANTIS Sta. 2950: 26°14'N 78°43'W; 285 fms; 3-II-1938. (MCZ).—Cuba: 1 ♂. ATLANTIS Sta. 2981: 22°48'N 78°48'W; 225 fms; 10-III-1938. (MCZ).—1 ♂, 1 ♀. ATLANTIS Sta. 3000: 23°10'N 81°29'W; 170-255 fms; 21-III-1938. (MCZ).—2 ♀. ATLANTIS Sta. 3384: 22°34'N 78°00'W; 290 fms; 26-IV-1939. (MCZ).—1 ♂. ATLANTIS Sta. 3388: 22°32'30"N 78°09'W; 255 fms; 26-IV-1939. (MCZ).— 1 ♂, 1 ♀. ATLANTIS Sta. 3391: 22°34' N 78°14'W; 220 fms; 27-IV-1939. (MCZ).—3 ♂. ATLANTIS Sta. 3392: 22°35'N 78°16'W; 225 fms; 27-IV-1939. (MCZ).—1 ♂. ATLANTIS Sta. 3410: 22°47'N 78°41'W; 260 fms; 29-1V-1939. (MCZ).

Description.—MALE: Trunk completely segmented. Neck long, with a dorsal swelling over the oviger bases. Posterior edge of trunk segments 1, 2, and 3 with a lowly conical tubercle. Lateral processes long, slender; distally almost without tuberculation; separated by 1½ to 2 times their own diameter. Lateral processes and neck with numerous short setae. Ocular tubercle conical, not very tall; eyes well-pigmented. Abdomen long, slightly bent downward.

Proboscis tripartite, rather clumsy, short.

Chelifore scape 2-segmented; basal segment 50-60 per cent of the length of the 2nd segment; both segments with several setae. Adults imperfectly, juveniles perfectly chelate.

Palp with large basal protuberance, implanted at the level of the ocular tubercle. Segment 5 shorter than segment 3, with long setae. Segments 4 and 6 short, about twice as long as wide; segment 4 less than one-third the length of segment 5. Segments 6 to 10 with short, dense pubescence along the ventral margin. Of the distal five segments, segment 8 is the longest.

Oviger segments 4 and 5 with short, recurved setules. Segment 6 distally somewhat widened, bearing a dense distal tuft of setae, that reach to about ⅔ of the length of segment 7. Segments 7 to 10 with 1 main row and 2 or 3 auxiliary rows of compound spines. The spines of the main row are very elongated and bear some 7 lateral teeth. Terminal claw unarmed.

Leg 1 shorter than the other legs and less setose. In all legs, the femur is the longest segment, and the 2nd tibia is shorter than the first. Short but numerous setae occur on the coxae and the femur, in P1 also on the tibiae. In P2 through P4, the tibiae bear a lateral row of longer setae. Cement gland pores occur, as slightly raised tubercles, in a single row on the posterior margin of the entire femur (P1) and on the entire femur and the proximal half of the first tibia (P2-P4). The number of pores, on femur and tibia 1, respectively, of the male holotype is: P1 22-0; P2 30-12; P3 30-16; P4 38-12. The length of the claw is dimorphic: very short in P1, about ⅓ the length of the propodus in P2-P4. Sexual pores on the ventrodistal margin of coxa 2 of legs 3 and 4.

FEMALE: Very similar to the male. Sexual pores on all legs. No cement gland pores. Setation and tuberculation as in male. Sixth oviger segment with a much less dense tuft of shorter setae.

Remarks.—This species was signalized by Hedgpeth, 1943, from the Bahamas and Cuba, in moderate depths (170-290 fms). Hedgpeth observed some of the differences with *Ascorhynchus armatus* (Wilson, 1881), a deep-water species found off the eastern United States, but did not consider them of specific importance.

After comparison with Hedgpeth's material, preserved in the Museum of Comparative Zoology, Cambridge, Mass., and having the rich GERDA material at hand, I think the Floridan and Caribbean samples differ constantly and distinctly from *A. armatus*, and deserve specific rank. Through the courtesy of Dr. C. A. Child, of the National Museum of Natural History, Washington, D.C., I have been able to compare the present material with typical *A. armatus* (from ALBATROSS Stations 2074, 2084, 2205, 2706, and 2732), dredged in depths of 1073 to 1309 fms. This comparison confirmed the existence of clear differences. To show these differences, a number of figures of the real *A. armatus* have been incorporated in the present paper (Fig. 3).

The most striking differences are: (1) lateral processes almost unarmed in *pararmatus* (with conical process in *armatus*); (2) lateral processes setose in *pararmatus* (smooth in *armatus*); (3) mid-dorsal trunk tubercles and ocular tubercle low in *pararmatus* (highly conical in *armatus*); (4) chelifore scape segment 1 has about 50-60 per cent of the length of segment 2 in *pararmatus* (80-90 per cent of segment 2 in *armatus*); (5) scape setose in *pararmatus* (almost unarmed in *armatus*); (6) legs, in particular the tibiae, setose in *pararmatus* (smooth in *armatus*); (7) cement gland pores on P1 on the femur only in *pararmatus* (on femur and tibia 1 in *armatus*); (8) cement gland pores on P2-P4 in the proximal half only of tibia 1 in *pararmatus* (on the entire first tibia in *armatus*); (9) number of cement gland pores ranging from 22 to 38 on the femur, and from 0 to 16 on tibia 1 in *pararmatus* (33-50 on the femur, 20 to 40 on tibia 1 in *armatus*); (10) terminal claw on legs 2 to 4 about ⅓ the length of the propodus in *pararmatus* (short on all legs in *armatus*).

I have not seen actual material of *A. agassizi* Schimkewitsch, 1893, and of *A. glaber* Hoek, 1881, but I think Cole, 1909, is right in considering them closely related to *A. armatus* (and consequently to *A. pararmatus*).

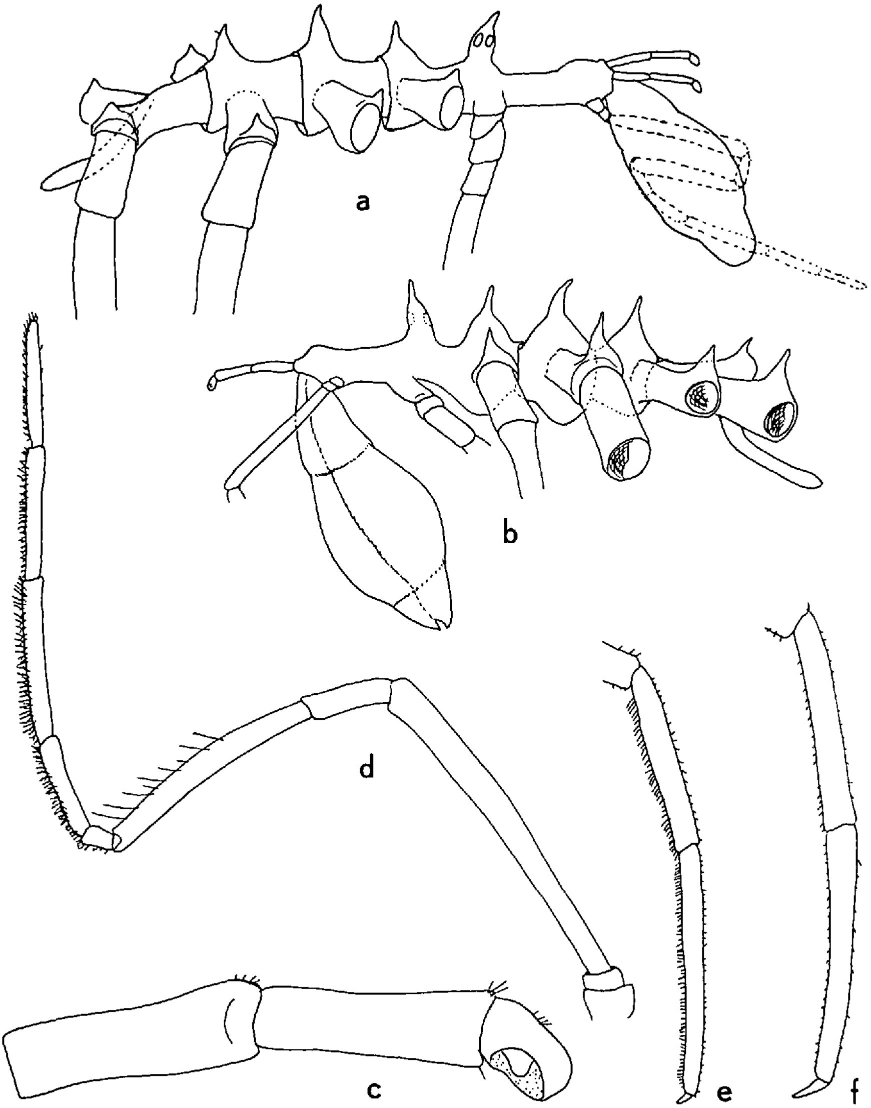

FIGURE 3. *Ascorynchus armatus* (Wilson, 1881), ♂. a, trunk from the right (4); b, trunk from the left (4); c, chelifore (2); d, palp (7); e, distal segments of leg 1; f, distal segments of leg 2 (to the same scale as e). Fig. 3a after a ♂ from TALISMAN Sta. 100; b, c, and d after a ♂ from ALBATROSS Sta. 2732; e and f after a ♂ from ALBATROSS Sta. 2706.

A. agassizi has, however, like *A. armatus* a short claw on all legs. It differs from both *armatus* and *pararmatus* in having palp segment 4 rather elongated, 3 to 4 times as long as wide, and slightly less than half as long as segment 5 (Schimkewitsch, 1893, pl. II fig. 12; Cole, 1909, pl. 3 fig. 5).

A. glaber agrees with *agassizi,* and thus differs from *armatus* and *pararmatus*, in the relative length of palp segment 4. The claw on the legs agrees with the situation found in *A. pararmatus,* but it differs from the latter in having the scape segments subequal.

Summarizing, though closely related, I consider all these four species different.

I have re-examined the specimen recorded by Bouvier, 1917: 35, and Bouvier, 1937: 38 under the name of *A. agassizi.* It is a large male (length of trunk 22 mm) from TALISMAN Sta. 100: 17°16'N 19°19'W, 1550 m, 17-VII-1883, preserved in the Muséum National d'Histoire Naturelle, Paris, under cat. no. 4742-86. The specimen is very similar to *A. armatus* and *A. agassizi,* but it has the short 4th palp segment of the former. The conical tubercles on the lateral processes (fig. 3a) are slightly lower than in material from the American East coast, but otherwise the TALISMAN specimen is indistinguishable from *A. armatus.* The locality of TALISMAN Sta. 100 is off Sénégal, thus far outside the North Atlantic range known for *A. armatus.*

Measurements of the ♂ (holotype) in mm are: length proboscis, 9.4; greatest diameter proboscis, 3.7; length trunk (frontal margin cephalic segment to base of abdomen), 15.6; length abdomen, 5.2; width across the 2nd lateral processes, 9.6; diameter 2nd lateral process, 1.60; space between lateral processes 2 and 3, 2.2; length scape segment 1, 0.78; and length scape segment 2, 1.43.

Measurements in mm of the articles of the first leg: coxa 1, 2.4; coxa 2, 6.0; coxa 3, 2.4; femur, 12.4; tibia 1, 11.0; tibia 2, 7.6; tarsus, 2.23; propodus, 2.70; and claw, 0.23. Measurements of the third leg: coxa 1, 3.2; coxa 2, 6.8; coxa 3, 3.0; femur, 14.8; tibia 1, 12.4; tibia 2, 7.8; tarsus, 1.83; propodus, 2.77; and claw, 1.03.

Ascorhynchus castelli (Dohrn, 1881)

Fig. 4

Barana castelli Dohrn, 1881: 123-129, pl. I figs. 1-16, pl. II fig. 1; Norman, 1908: 227; d'Arcy Thompson, 1909: 533.

Barana castelnaudi Ortmann, 1891: 159.

Ascorhynchus castelli.—Loman, 1912: 8 (pro parte, vide Bouvier, 1917: 37); Bouvier, 1917: 5, 6; Bouvier, 1923: 49, fig. 46; Giltay, 1929: 174-175; de Haro, 1966a: 665; de Haro, 1966b: 8, 10, fig. 4; Soyer, 1966: 2; Stock, 1966: 407; Stock, 1968: 10-11, fig. 2; Ledoyer, 1968: 170.

Material.—Colombia: 1 ♂ ov. VELERO III Sta. A 14-39: 12°11'55"N

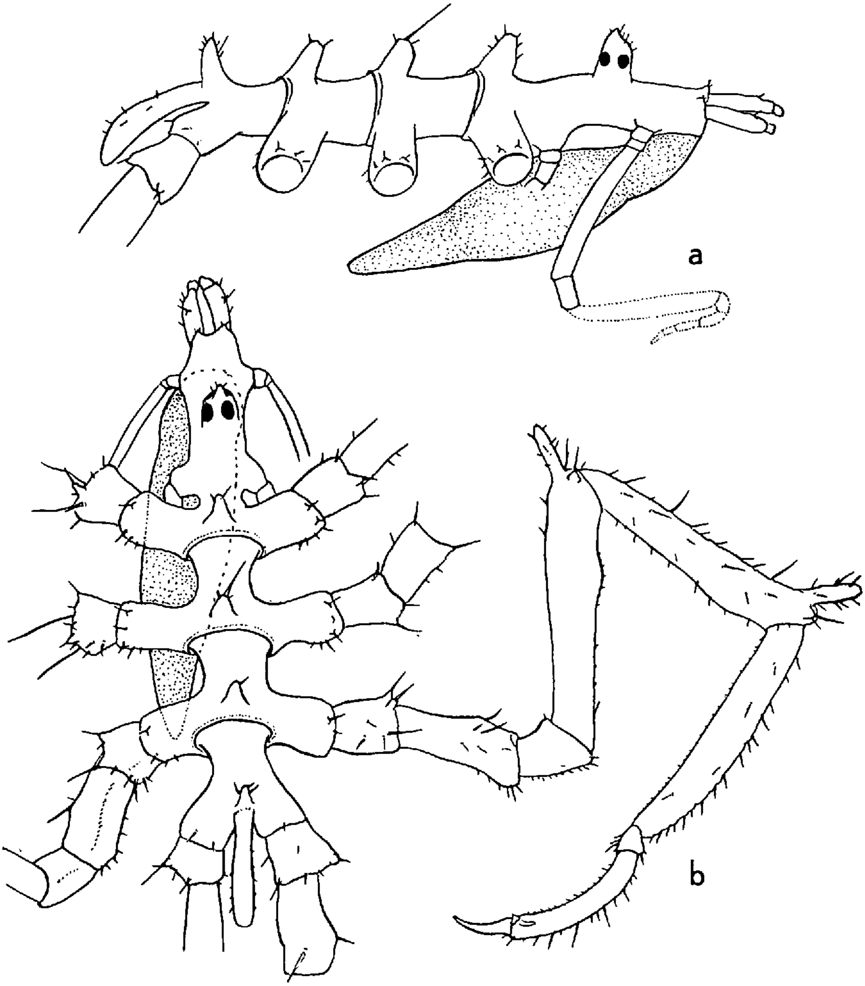

FIGURE 4. *Ascorhynchus castelli* (Dohrn, 1881), ♂. a, trunk from the right; b, trunk and 3rd leg, dorsal. Free-hand sketches; from VELERO Sta. A 14-39.

72°11'30"W-12°11'52"N 72°11'20"W (= 2 mi. SW. of Cabo de la Vela); 21-22 fms; grey sand; 8-IV-1939. (AHF).

Remarks.—Dohrn's original figures apparently did not turn out too well. At any rate, his figures indicate the dorsal tubercles of the trunk much smaller than the eye tubercle, each without any spines or setae, whereas the text says: "jedes Segment (des Körpers) trägt auf dem Rücken in der

Mittellinie einen mit Dornen ausgestatteten Höcker von der Grösse des Augenhöckers". Dohrn illustrates the proboscis short and robust, although the text calls the "Schnabel etwas länger als die Hälfte des Körpers". Furthermore, the ocular tubercle is not situated as far forward as Dohrn's figure indicates. The femur and tibia 1 bear a distinct distal spur and 2 smaller prominences, which were not mentioned in the original description.

The size, and the structural details of palps, ovigers, and tarsal segments agree with Dohrn's description.

A. castelli is new to the western Altantic. It has been recorded hitherto from the Mediterranean Sea (Naples—Dohrn; Gulf of Genova—Soyer; St. Raphael, France—Loman, Bouvier; Marseille, France—Ledoyer; Banyuls, France—Giltay, Stock; north-eastern Spain—de Haro). Loman's record (1912) from 1500 m off S.E. Portugal is in reality based on *A. abyssi* Sars (vide Bouvier, 1917). Discarding Loman's Portugese record, the bathymetrical range is 0 to 40 m.

Ascorhynchus castellioides Stock, 1957

Ascorhynchus castellioides Stock, 1957: 82-84, fig. 2.

Material.—Florida: 1 specimen. Pigeon Key, on coral; 30-I-1965; L. B. Holthuis coll. (RMNH).—1 ♀. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—Jamaica: 1 specimen. Hummelinck Sta. 1148: Kingston, Myrtle Bank landing (wooden and concrete piles); mud; tidal and lower zone; 15-VIII-1949. (ZMA).—Puerto Rico: 11 specimens. Combate, on cement pilings covered with different algae, sponges and hydroids; 1-5 ft; 12-V-1967; V.A. Capriles coll. (ZMA).—Margarita: 4 specimens. Hummelinck Sta. 1449: Puente de La Restinga; boulders near *Rhizophora*; 11-I-1964. (ZMA).—Bonaire: 1 specimen. Hummelinck Sta. 1566. Lac, Secu di Sorobon, 250 m N. of Sorobon Point; 10-50 cm; *Porites* flat, *Lithothamnion;* 21-VIII. 1967. (ZMA).—Curaçao: 2 juv. Mouth Piscadera Bay; on spines of *Eucidaris tribuloides*; abt. 1 m; XII-1956; L. B. Holthuis coll. (RMNH).—53 specimens (partially ovigerous). Piscadera Bay; on red sponge; abt. 1 m; 28-IX-1958; J. H. Stock coll. (ZMA).—2 specimens. Piscadera Inner Bay; washed from sponges and hydroids; 0.5 m; 29-XI-1958; J. H. Stock coll. (ZMA).—1 specimen. Hummelinck Sta. 1029A: Piscadera Bay, on fence of swimming pool; 1-1.5 m; 29-I-1949. (ZMA).— 1 juv. Hummelinck Sta. 1620: Piscadera Bay, outer bay; piling (iron and wooden poles); 0-1 m; 14-X-1967. (ZMA).—Canal Zone: 16 specimens. PILLSBURY Sta. 323: Cristobal, pilings of pier 9/10; dip net; 6-VII-1966. (UMML).

Remarks.—Apparently a common shallow water species in the West Indian region. Feeds probably on sponges.

Ascorhynchus latipes (Cole, 1906)

Ascorhynchus latipes.—Hedgpeth, 1948: 256 (refs.); Hedgpeth, 1954: 427; Stock, 1954a: 116.

Material.—Curaçao: 1 ♀. Hummelinck Sta. 1448: Piscadera Bay, Boca, west; 1-1.5 m; sandy; 5-I-1964. (ZMA).

Remarks.—Apparently much rarer than the previous species in the West Indies. Morphologically, it can be easily confused with it.

Ascorhynchus serratus Hedgpeth, 1948.

Ascorhynchus serratus Hedgpeth, 1948: 259-260, fig. 44a-f.

Material.—Florida: 1 ♀. GERDA Sta. 679: 25°56'N 78°09'W-25°56'N 78°05'W; 595-711 m; 20-VII-1965. (RMNH).

Remarks.—The chelifores of the present specimen are partially lacking, so their structure remains unknown. Otherwise, the specimen is unseparable from *A. serratus*, a rare species hitherto recorded only at ALBATROSS Sta. 2359 (off Yucatan, 231 fms).

Ascorhynchus ovicoxa n. sp.

Figs. 5-6

Material.—Florida: 1 ♀ (holotype), 4 paratypes. GERDA Sta. 652: 27° 07'N 79°46'W-27°09'N 79°45'W; 403-393 m; 16-VII-1965. (USNM).—1 specimen (♀ ?). GERDA Sta. 122: 24°02.5'N 82°03.5'W-24°11'N 81° 57'W; 715-686 m; 19-VI-1963. (ZMA).

Description.—FEMALE (holotype): The trunk is completely segmented; each trunk segment bears, near the base of the lateral processes, dorsally 2 long setae. A shorter seta is present on the posterodistal end of lateral processes 1, 2, and 3. No tubercles on the trunk. Ocular tubercle reduced to an eye-less, low swelling in the middle of the neck, on which 2 anterior and 1 posterior pointed tubercles arise. Oviger implantation almost in contact with the anterior border of the first lateral process. Abdomen reaching to the base of coxa 2 of leg 4.

Proboscis of the usual tripartite shape.

Chelifore scape 1-segmented, armed with a couple of long setae and some tubercles. Chela of variable shape, somtimes club-shaped without trace of fingers, but with short setae, in other specimens with pointed protuberances that may be considered the rudiments of fingers.

Palp 10-segmented; segment 3 the longest; segment 6 shorter than 7, subequal to 8, 9, and 10.

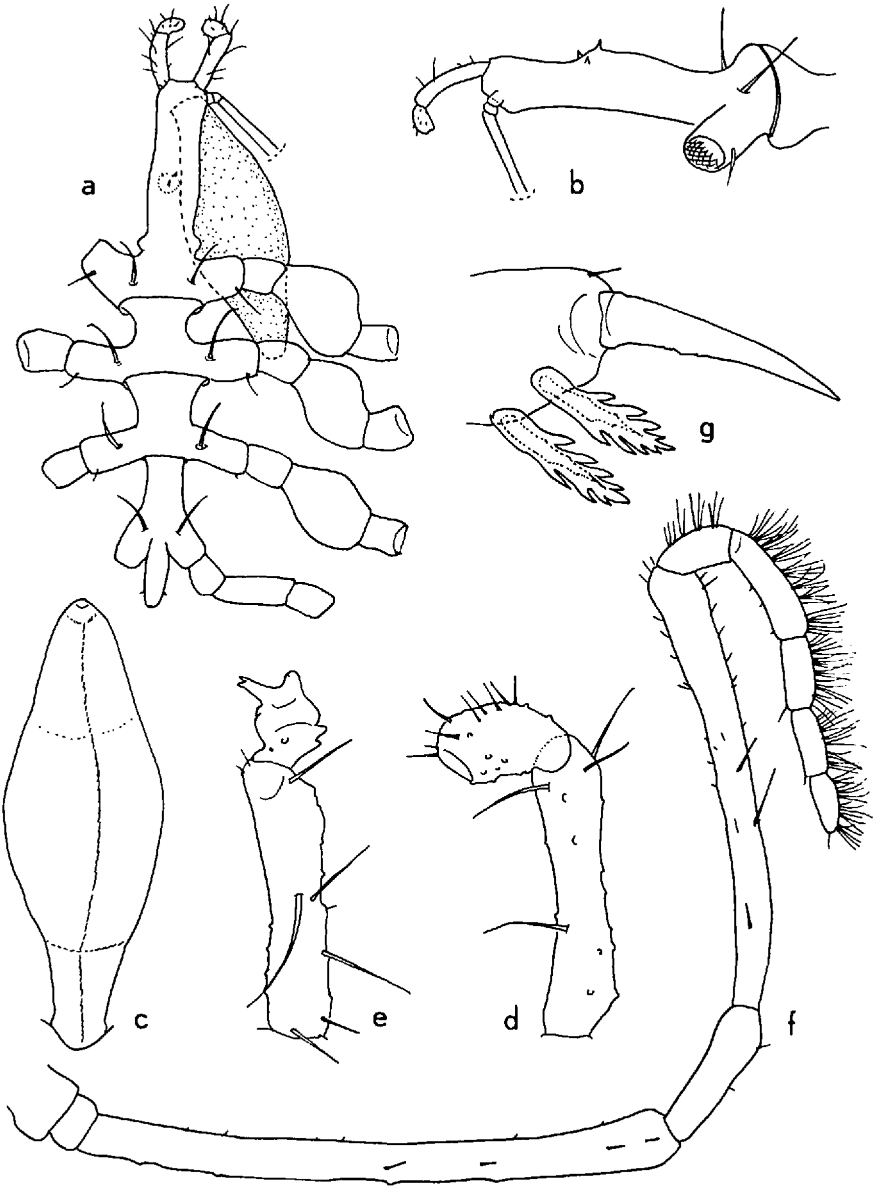

FIGURE 5. *Ascorhynchus ovicoxa* n. sp., ♀. a, trunk, dorsal (scale 5); b, cephalic segment, from the left (free-hand sketch); c, proboscis, ventral (1); d, chelifore (6); e, chelifore of another ♀ (6); f, palp (6); g, terminal portion of oviger (8). All from GERDA Sta. 652.

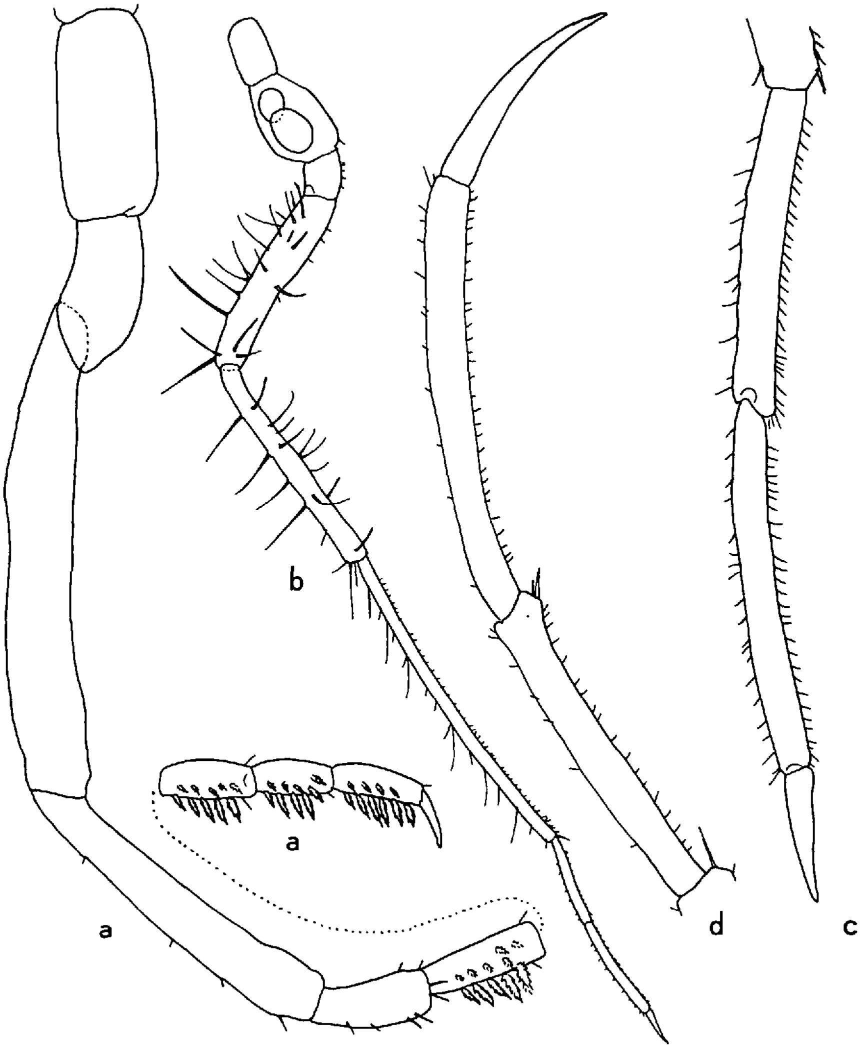

FIGURE 6. *Ascorhynchus ovicoxa* n. sp., ♀. a, oviger (scale 6); b, first leg (5); c, distal segments of leg 1 (6); d, distal segments of leg 4 (6). All from GERDA Sta. 652.

Oviger segments 7 to 10 with 1 row of larger compound spines (formula 5 : 5 : 5 : 6), and a second row of smaller compound spines. Terminal claw smooth. Each compound spine is slender and bears 4 lateral teeth at either edge.

The long leg segments bear very long setae (twice as long as the diameter of the article), curved on the femur. The 2nd coxa of legs 1 to 3 is swollen to contain the ripe eggs. The thin 2nd tibia is the longest segment. In leg 1, the propodus is slightly longer than the tarsus, in leg 4 much longer. The claw is also relatively longer in leg 4. The propodal sole is evenly armed with numerous small spinules. No auxiliary claws.

Remarks.—The proposed specific name, *ovicoxa* alludes to the swollen 2nd coxae that contain the eggs. In most Pycnogonida, the femur contains the eggs, but in *Ascorhynchus abyssi* G. O. Sars, 1877 (figure in Sars, 1891, pl. XIV fig. 2), the situation is similar to that found in the present species. However, the present species is longitarsal, whereas *A. abyssi* is brevitarsal.

There are only a few *Ascorhynchus* species that, like *A. ovicoxa* n.sp., are longitarsal in combination with a 1-segmented scape and absence of mid-dorsal tubercles. These species are *A. longicollum* (Haswell, 1885), *A. glaberrimus* Schimkewitsch, 1913, and *A. birsteini* Turpaeva, 1971b. The latter species is the only one that agrees with *A. ovicoxa* in the absence of eyes and of an ocular tubercle. However, *A. birsteini* (a Pacific deep-sea species) is apparently different from the Caribbean material at hand by its recurved abdomen, non-setiferous trunk, more slender proboscis, much larger size, etc.

Measurements of ♀ (holotype) is mm are: length (frontal margin cephalic segment to tip abdomen), 3.13; width across 2nd lateral processes, 0.95; diameter 2nd lateral process, 0.23; space between lateral processes 2 and 3, 0.33; length abdomen, 0.43; length proboscis (ventral), 1.25; greatest diameter proboscis, 0.56; and length scape, 0.30.

Measurements in mm of the articles of leg 1: coxa 1, 0.25; coxa 2, 0.55; coxa 3, 0.23; femur, 0.97; tibia 1, 1.19; tibia 2, 1.67; tarsus, 0.41; propodus, 0.48; and claw, 0.18. Measurements of leg 4: coxa 1, 0.24; coxa 2, 0.47; coxa 3, 0.18; femur, 1.04; tibia 1, 1.22; tibia 2, 1.61; tarsus, 0.40; propodus, 0.54; and claw, 0.25.

Ascorhynchus sp.

Material.—1 specimen (juv. ?). Hummelinck Sta. 1458: Curaçao: Piscadera Bay, Boca, west; 1-1.5 m; sandy; 5-I-1964. (ZMA).

Remarks.—This specimen resembles *A. latipes* (Cole, 1906) but has more widely spaced lateral processes, and taller tubercles on the trunk. Moreover, there are far less spinules on the propodal sole. I am unable to find sexual pores, so the specimen may be a juvenile.

Ammothella rugulosa (Verrill, 1900)

Ammothella rugulosa.—Hedgpeth, 1948: 247, fig. 39a (refs.); Hedgpeth, 1954: 427; Stock, 1954a: 116-117; Bourdillon, 1955: 598.

Material.—Florida: 1 ♂ ovig., 1 ♀. Biscayne Bay, Miami, from fouling of a naval vessel which had been at anchor in Biscayne Bay for about 1 year; 27-I-1947; F. M. Bayer & C. E. Dawson coll. (ZMA).—4 specimens. Sands Key Cut; 14-IV-1963; C. N. d'Asaro coll. (UMML).—1 ♂ ovig. Bear Cut, Miami, Lab. dock, from test panel; 4-IV-1963; C. N. d'Asaro coll. (ZMA).—Puerto Rico: 1 juv. Morrillos; on *Sargassum* sp., collected in less than 5 ft of water; 29-II-1968; V. A. Capriles coll. (ZMA).

Remarks.—This species is most probably synonymous with *A. appendiculata* (Dohrn, 1881). The characters used by Hedgpeth, 1948 (in a key) to distinguish the two species are not very satisfactory. I have never seen specimens with hollow spines on the lateral processes (according to Hedgpeth a *rugulosa* characteristic); such spines are not illustrated in Hedgpeth's fig. 39a either.

I have provisionally considerd specimens with a long ocular tubercle, a very long abdomen, and a first scape segment that is less than half as long as the second, as *A. appendiculata.* Such specimens often lack, in agreement with Hedgpeth's key, clubbed spines on the first scape segment, but exceptions occur.

As *A. rugulosa* I have treated in the present paper those specimens having a short ocular tubercle, a short abdomen, and with subequal scape segments 1 and 2.

Ammothella appendiculata (Dohrn, 1881)

Ammothella appendiculata.—Stock, 1955b: 250, fig. 18 (refs.).

Material.—Florida: 1 ♂ ovig., 1 ♀, 2 juv. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—10 specimens. Hummelinck Sta. 1410A: Key Biscayne, north point; *Rhizophora*; 1-IX-1963. (ZMA).—Puerto Rico: 1 specimen. Cayo Enrique (= off La Parguera); abt. 1 m; on coral, *Isophyllia sinuosa* (Edw. & Haime); 29-I-1963; J. H. Stock coll. (ZMA).—2 specimens. Joyuda; on *Sargasum;* 20-IV-1967; V. A. Capriles coll. (ZMA).—St. Martin: 1 ♂, 1 ♀. Pointe Bluff; inlet of lagoon; 0.10 m; 3-II-1959; J. H. Stock coll. (ZMA).—Antigua: 1 juv. Hummelinck Sta. 1393: Deep Bay at Fort Barrington; 17-VII-1955. (ZMA).—Bonaire: 10 specimens from the following Hummelinck Stations, all situated in Lac, muddy with *Rhizophora*: 1062, 1066, 1066a, 1569, 1576, 1580, 1587A, 1590. (ZMA).—Curaçao: 3 specimens from the following Hummelinck Stations, all situated in Piscadera Bay, *Rhizophora, Halimeda, Thalassia*: 1461, 1463, 1463A. (ZMA).—1 ♀. Spaanse Water, north, Jan Sofat; islet; *Rhizophora*; rocky; 17-XI-1968. (ZMA).—French Guiana: 1 ♂. LUYMUS Guyana Shelf Exped. Sta. 14: 06°44'N 52°45'W; 76 m; muddy calcareous sand; 26-VIII-1970. (RMNH).

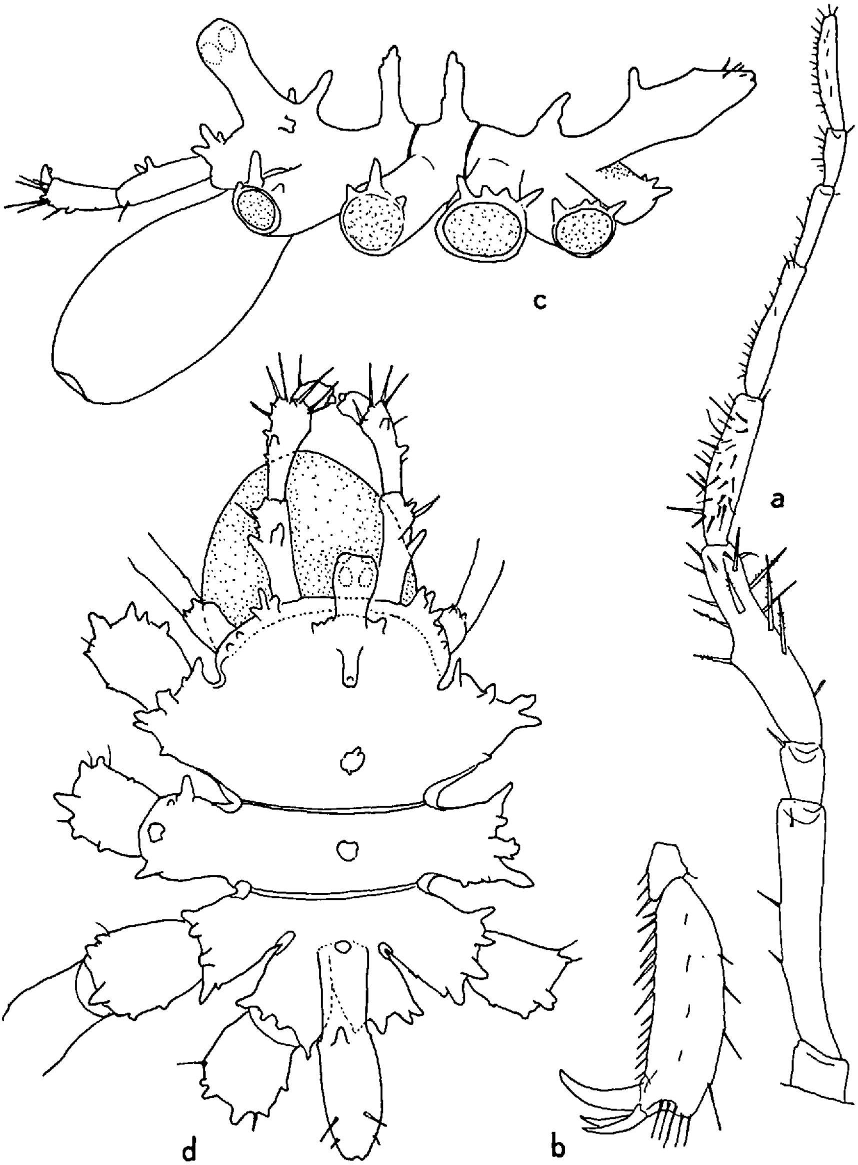

FIGURE 7. a-b, *Ammothella marcusi* Hedgpeth, 1948, ♂. a, palp (scale 6); b, distal segments of leg 1 (6). c-d, *Ammothella exornata* n. sp., holotype ♀. c, trunk from the left (scale 9); d, trunk, dorsal (9). Fig. 7a-b after ♂ from Hummelinck Sta. 1565, c-d after a ♀ from Hummelinck Sta. 1429.

—Panamá: 1 ♀. PILLSBURY Sta. 568: Punta Poitilla, 13-V-1967. (UMML).

Remarks.—There is an enormous variation in slenderness, of the legs, ocular tubercle, abdomen, cement gland duct, and hollow spines. This large variation makes me suspicious about the validity of *Ammothella rugulosa* (see at that place).

Ammothella marcusi Hedgpeth, 1948
Fig. 7a-b

Ammothella marcusi Hedgpeth, 1948: 247-249, fig. 39 b-g; Hedgpeth, 1954: 427.

Material.—St. John: 1 ♀. Hummelinck Sta. 1407: Turner Bay, east; on debris; 18-VI-1955. (ZMA).—Bonaire: 1 specimen, all legs lacking. Hummelinck Sta. 1068a: Lac, Boca; behind the reef; sandy reef; 1-2 m; 1-X-1948. (ZMA).—1 ♂. Hummelinck Sta. 1565: Lac, Secu di Sorobon, 100 m N. of Sorobon Pt.; sandy, *Lithothamnion* flat; 0.25-1.00 m; 21-VIII-1967. (ZMA).

Remarks.—Although the overall habitus is in good agreement with *A. marcusi*, several structural details do not correspond entirely with Hedgpeth's small scale figure.

So, Hedgpeth's figure 39b suggests that the distal four palp segments are more or less equal in length; in the present material, these segments are of different lengths (Fig. 7a).

The propodus in the present material is more heavy, and its sole is less curved, than the original description suggests (Fig. 7b). The basal spines of the propodus are also less elongate.

The 7th and 8th oviger segments (♂) are synaxially articulated; this condition is not properly shown in Hedgpeth's fig. 39g.

A. marcusi was hitherto known from a single specimen, collected in shallow waters in the Tortugas.

Ammothella exornata n. sp.
Figs. 7c-d, 8

Material.—St. Martin: 1 ♀ (holotype) and 1 ♀ (paratype). Hummelinck Sta. 1429: Oyster Pond, south-east; on and near *Rhizophora*; 13-X-1963. (ZMA).—Bonaire: 2 ♀. Hummelinck Sta. 1377: Lagoen, north, west coast; on algae; 2-IV-1955. (ZMA).

Description.—FEMALE: Trunk broadly ovate in outline, lateral processes separated by narrow intervals. Trunk segments 1 and 2, and 2 and 3 with clear intersegmental lines. Neck short, wide; anterior margin armed with a large, tricuspidate and with several smaller tubercles. Tall, finger-shaped,

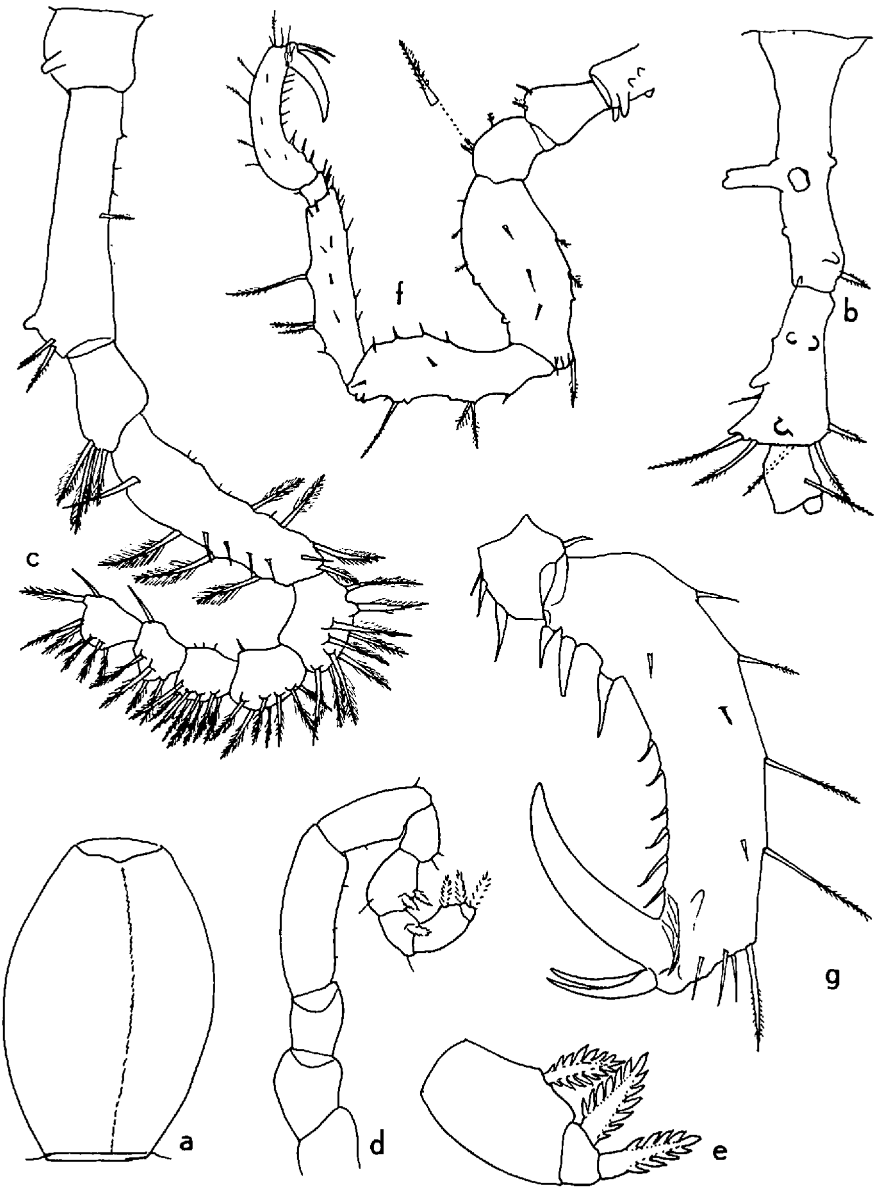

FIGURE 8. *Ammothella exornata* n. sp., holotype ♀. a, proboscis, ventral (scale 9); b, chelifore (10); c, palp (10); d, oviger (6); e, distal portion of oviger (11); f, third leg (12); g, distal segments of leg 3 (10). All from Hummelinck Sta. 1429.

rugose mid-dorsal tubercles on the posterior margin of trunk segments 1 and 2. A slightly lower tubercle at the base of the abdomen. Lateral processes distally provided with 3 or 4 distinct tubercles.

Ocular tubercle cylindrical, slightly widened distally; eyes well-pigmented. At the caudal side, near the implantation, the ocular tubercle carries 2 low lateral and one taller medial tubercles, the latter pointing obliquely backward.

Abdomen moderately long, straight, clavate, armed with a distinct dorsal tubercle slightly proximad of the middle; 4 small spinules near the distal end.

Proboscis broadly ovate, in dorsal as well as in lateral view.

Chelifore scape 2-segmented; segment 1 distinctly longer than segment 2. Segment 1 with 2 larger dorsal tubercles near the middle and with several minute tubercles. Segment 2 distally widened, armed with several smaller tubercles. Segment 1 bears moreover 1 (distal) barbed spine; segment 2 bears also barbed spines: at least 4 distal and 2 subdistal ones. Chela with a roughly rectangular palm and a knob-like rudiment of the movable finger, the former with one barbed spine.

Palp 9-segmented. One tubercle on each of the segments 1 and 2. All segments, except 1, bear barbed spines. Segments 8 and 9 with a bulbous ventral expansion. Segments 8 to 10 about of equal mutual lengths.

Oviger short, 10-segmented. Only segment 4 is elongated. Compound spine formula 2 : 2 : 1 : 2. No terminal claw. Compound spines foliate, with 4 to 7 lateral teeth on either side.

Legs fairly short. Coxa 1 with several lateral and distal tubercles. Coxae 1 to 3 not much different in length. Femur swollen to contain the eggs. Barbed setae on all leg segments, except coxa 1 and tarsus. Long barbed setae on the dorsal side of the femur (distal), tibia 1 (distal and medial), and tibia 2 (medial). Propodus gently curved; heel with 3 spines; sole with about 6 spinules. Claw rather short; auxiliary claws about half as long as the main claw. Genital pores on the ventral surface of coxa 2 of all legs.

Measurements of the ♀ holotype (in mm) are: length trunk (frontal margin cephalic segment to tip 4th lateral process), 0.80; width across 2nd lateral processes, 0.73; length proboscis (ventral), 0.57; greatest diameter proboscis, 0.33; length scape segment 1, 0.20; and length scape segment 2, 0.16. Measurements of leg 3 in mm are: coxa 1, 0.20; coxa 2, 0.25; coxa 3, 0.18; femur, 0.55; tibia 1, 0.48; tibia 2, 0.50; tarsus, 0.08; propodus, 0.38; claw, 0.19; and auxiliary claws, 0.10.

Remarks.—In general aspect, this species resembles superficially *Ammothella uniunguiculata* (Dohrn, 1881), but it is very different from that species in almost all structural details.

There are only 4 *Ammothella* species having mid-dorsal tubercles: *A. menziesi* Hedgpeth, 1951, *A. tuberculata* Cole, 1904, *A. stocki* Clark, 1963, and *A. thetidis* Clark, 1963. Of these, Clark's two Australian species are very different from the present West Indian form: *thetidis* is a slender species, with auxiliaries that are longer than the main claw; *stocki* bears only two blunt papillae, both placed on the dorsal side of trunk segment 2, moreover it has hollow spines—instead of barbed ones—on the legs.

A. tuberculata has low mid-dorsal tubercles, lacks tubercles on the ocular peduncle and abdomen, has the first scape segment smooth and shorter than the second, etc.

A. menziesi, from California, is no doubt the most closely related species. It differs from the present material in lacking tubercles on the posterior side of the ocular peduncle and on the abdomen, in the absence of plumosity of the setae on the appendages, and in the chelifore scape of which segment 2 is the longest. (It should be remarked that the sentence, in the description of *A. menziesi* on p. 110 of Hedgpeth's paper, reading "auxiliaries about as long as the terminal claw" is an obvious lapsus, as is clear from Hedgpeth's figures and from the table of measurements.)

The proposed specific name, *exornata*, means "adorned" and refers to the armature of trunk and appendages.

Nymphopsis duodorsospinosa Hilton, 1942

Refs.: Hedgpeth, 1948: 250; Hedgpeth, 1954: 427.

Material.—Florida: 1 juv. Bear Cut, north point of Key Biscayne, Miami; in eelgrass, sponges, algae; 0-1 m; 27-VII-1966; L. B. Holthuis coll. (RMNH).—1 ♀, 1 juv. Same locality, on eelgrass and serpulids; 0-1 m; 3-VIII-1963; L. B. Holthuis coll. (RMNH).

Remark.—Previously reported by Hedgpeth from the same general area.

Nymphopsis sp.

Material.—Canal Zone: 1 juv. (cf. *anarthra* Loman). PILLSBURY Sta. 321: west shore of Limon Bay, 1400 m S of Pulpit Point; 5-VII-1966. (UMML).—Brazil: 1 juv. RECIFE Sta. 98: 08°16.7'S 34°54.1'W; 14.5 m. (ZMA).

Remarks.—The juvenile from Recife Sta. 98 represents no doubt a new species. It has a 1-segmented chelifore scape, 3 tall dorsal trunk tubercles, and very small auxiliary claws on all legs. These characters suffice to discriminate the Brazilean specimen from the other species of the genus. The chelifores are chelate, however, and the palps and ovigers are incompletely segmented. There seems to be little use in giving this juvenile a specific name.

Eurycyde raphiaster Loman, 1912.

Eurycyde raphiaster Loman, 1912: 13; Bouvier, 1917: 33-35, pl. IV figs. 2-7; Hedgpeth, 1948: 260-261, fig. 45; Fage, 1952c: 530; Hedgpeth, 1954: 427; Stock, 1954a: 116; Fage & Stock, 1966: 316.

Material.—Bonaire: 1 ♀. Hummelinck Sta. 1566: Lac, Secu di Sorobon, 250 m N. of Sorobon Pt.; *Porites* flat, *Thalassia, Lithothamnion*; 10-50 cm; 21-VIII-1967. (ZMA).—Curaçao: 1 ♀. St. Michiels Bay; on hydroids; abt. 1 m; 29-X-1958; J. H. Stock coll. (ZMA).—2 specimens. Hummelinck Sta. 1458: Piscadera Bay, Boca, West; 1-1.5 m; sandy; 5-I-1964. (ZMA).—Guyana: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 94: 06°56'N 57°30'W; 26 m; mixed hard bottom; 2-IX-1970. (RMNH).

Remark.—The present specimens resemble closely Hedgpeth's (1948) figure.

Prototrygaeus n. gen.

Diagnosis.—Lateral processes, eye tubercle, and abdomen very elongated (♂, ♀). Proboscis (♂, ♀) cylindrical. Scape (♂, ♀) 2-segmented; chela reduced in adults, chelate in juveniles. Palp (♂, ♀) 6-segmented. Oviger 9-segmented (♂) or 10-segmented (♀); special spines present (♂) on segments 7 and 9, or absent (♀); terminal claw absent (♂) or present (♀). Claw of walking legs pectinate.

Type-species.—*Prototrygaeus ammothelloides* n.sp.

Remarks.—The present new genus combines certain features of several other ammotheid genera. The body shape resembles *Pycnofragilia* Hedgpeth, 1948 (= *Fragilia* Loman, 1908, preocc.). The chelifores, the ocular tubercle, and the armature of the lateral processes are reminescent of *Ammothella.* The palps, oviger, and proboscis are not without similarity to those of *Trygaeus* Dohrn, 1881. The strange combination of these features seems to justify the creation of a new genus.

Prototrygaeus ammothelloides n. sp.

Fig. 9

Material.—Guyana: 1 ♂ ovig. (holotype). LUYMUS Guyana Shelf Exped. Sta. 76: 06°41'N 57°18'W; 23 m; sandy mud; 1-IX-1970. (RMNH).—1 ♂ ovig., 1 ♀, 4 juv. (paratypes). LUYMUS Guyana Shelf Exped. Sta. 74: 06°46'N 57°16'W; 27.5 m; muddy sand; 31-VIII-1970. (RMNH).

Description.—MALE: A small species. Trunk with articulation lines between segments 1 and 2, and 2 and 3. Neck short, swollen. Lateral processes very elongated, armed with a posterior (rarely also with an anterior) papilla (lateral process 1), with 1 to 4 anterior (lateral process 4), or with

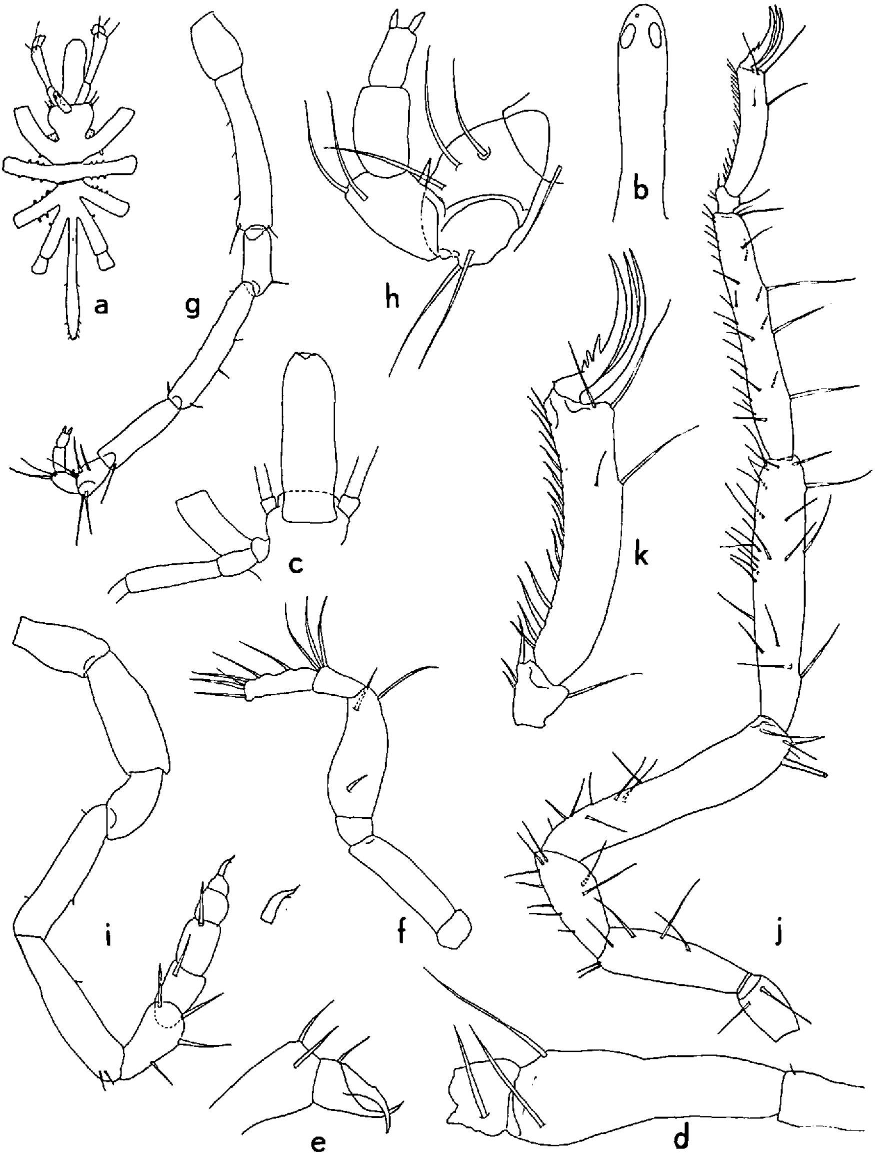

FIGURE 9. *Prototrygaeus ammothelloides* n. gen., n. sp. a, trunk, ♂, dorsal (scale 25); b, ocular tubercle, ♂, lateral (33); c, anterior part of the body, ♂, ventral (28); d, chelifore, ♂ (33); e, chelifore, juvenile (35); f, palp, ♂ (33); g, oviger, ♂ (35); h, distal oviger segments, ♂ (36); i, oviger, ♀ (31), with distal spine more enlarged; j, second leg, ♂ (28); k, distal portion of second leg, ♂ (35). a, b, c, d, f, g, h, j, and k after the holotype from LUYMUS Guyana Shelf Exped. Sta. 76; e and i after a juvenile from the same expedition, Sta. 74.

3 to 4 anterior and posterior (lateral processes 2 and 3) papillae. Abdomen exceedingly long, straight, unarmed except for some setules. Ocular tubercle very tall, apically rounded; eyes in terminal position.

Proboscis narrowly cylindrical.

Chelifore scape 2-segmented; basal segment about ⅓ of the distal segment. Chela reduced, non-functional. Scape with 2, chela with 1 long setae.

Palp 6-segmented. Segments 2 and 4 elongated, 4 moreover somewhat swollen. Segments 1 to 3 naked; 4 with 3 setae; 5 with 3 setae; 6 with 6 setae.

Oviger 9-segmented; segment 2 the longest; segments 4 and 5 elongated; segment 6 with a kind of anaxial swelling, but less pronounced than in *Trygaeus*. Simple special spines on segment 7 (1 spine) and 9 (2 spines). Segment 8 unarmed. Eggs rather large, grouped in several balls on the ovigers.

Legs slender, setose. Tarsus short. Propodus slightly curved, armed with 4 slender basal spines, and a row of some 12 stiff setae on the sole. Heel not pronounced. Claw very remarkable by the presence of 3 or 4 strong teeth on the proximal part of the inner margin. Auxiliary claws very slender, slightly longer than the main claw. Cement gland of the *Ammothella*-type: a long, narrow duct at the distal end of the femur.

FEMALE: Very similar to the male, in general morphology as well as in armature of lateral processes, legs, and claw. Genital pores large, on the ventral surface of coxa 2 of all legs. Coxa 2, and in particular the femur, more swollen than in the male. Oviger 10-segmented; segment 6 almost without anaxial swelling. Segment 6 with 4 spine-like setae, segments 7 and 8 each with 1 such seta; segment 9 unarmed; segment 10 small, with a curved spine or claw, bearing a single lateral tooth.

JUVENILE: Still chelate. Chela perfect, with unarmed fingers, gaping (Fig. 9e). Tubercles on lateral processes still almost or entirely lacking. Claw on the legs already as in the adult.

Measurements of the ♂ holotype in mm are: length trunk (frontal margin cephalic segment to base of abdomen), 0.50; width across 2nd lateral processes, 0.72; diameter 2nd lateral process, 0.08; interval between 2nd and 3rd lateral process, 0.13; length abdomen, 0.47; greatest diameter abdomen, 0.05; length proboscis (ventral), 0.30; greatest diameter proboscis, 0.10; scape segment 1, 0.07; and scape segment 2, 0.22. Measurements of the second leg in mm are: coxa 1, 0.11; coxa 2, 0.27; coxa 3, 0.19; femur, 0.49; tibia 1, 0.52; tibia 2, 0.50; tarsus, 0.04; propodus, 0.23; claw, 0.13; and auxiliary claws, 0.14.

Achelia sawayai Marcus, 1940

Achelia sawayai.—Fry & Hedgpeth, 1969: 105 (refs.).

Material.—Florida: 18 specimens. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—10 specimens. Hummelinck Sta. 1410A: Key Biscayne, North Point; *Rhizophora;* 1-IX-1963. (ZMA).—1 ♀, 2 juv. Hummelinck Sta. 1411: Key Biscayne, N.E. point; beach rock; 7-IX-1963. (ZMA).—Puerto Rico: 1 ♀. Hummelinck Sta. 1420: Bahia Fosforescente, N.; *Rhizophora;* 17-IX-1963. (ZMA).—1 juv. Small coral island called Mata Cagada (near Isla Maguey, La Parguera); 0.30 m; on sponge; 31-I-1963; J. H. Stock coll. (ZMA).—St. Croix: 1 ♂ ovig., 2 ♀, 2 juv. Hummelinck Sta. 1405: Krausse Lagoon, entrance; 15-VI-1955. (ZMA).—St. Martin: 1 ♂ ovig. Hummelinck Sta. 1129: Simson Bay Bridge; wooden piles, sand, eelgrass; tidal and lower zone; 4-VIII-1949. (ZMA).—Los Frailes: 1 ♂. Hummelinck Sta. 1214: Puerto Real; rock debris, sand; 3-4 m; 18-VI-1936. (ZMA).—Margarita: 1 juv. Hummelinck Sta. 1449: Puente de La Restinga; boulders near *Rhizophora*; 11-I-1964. (ZMA).—Bonaire: 1 ♂, 3 juv. Hummelinck Sta. 1565: Lac, Secu di Sorobon, 100 m N. of Sorobon Pt.; sandy, *Lithothamnion* flat; 25-100 cm; 21-VIII-1967. (ZMA).—1 ♀, 3 ♂. Hummelinck Sta. 1576A: Lac, Cai, E. side; 25-100 cm; muddy; *Thalassia*; *Halimeda*; 16-IX-1967. (ZMA).—Klein Bonaire: 1 juv. Hummelinck Sta. 1369: N. shore; 30-III-1955. (ZMA).—Curaçao: 1 ♀. Hummelinck Sta. 1039: Fuik Bay, Newport Bath; rock, muddy sand; tidal and lower zone; 20-XI-1948. (ZMA).—1 ♀. Hummelinck Sta. 1460A: Piscadera Bay, Boca, W.; sandy; *Rhizophora* decay; *Halimeda*; 14-XII-1963. (ZMA).—1 ♂ ovig., 1 ♀, 2 juv. Hummelinck Sta. 1461A: Piscadera Bay, Boca, W.; rock pools; sandy; *Rhizophora* and *Bontia;* 14-XII-1963. (ZMA).—1 juv. Hummelinck Sta. 1463A: Piscadera Bay, entrance, W.; 1 m; *Halimeda, Thalassia*; 14-XII-1963. (ZMA).—1 ♀. Hummelinck Sta. 1486: Piscadera Bay, N.E.; small bay; 3.5 m; sandy mud; 30-X-1963. (ZMA).—9 specimens. Hummelinck Sta. 1620: Piscadera Bay, outer bay; piling (iron and wooden poles); 0-1 m; 14-X-1967. (ZMA).—French Guiana: 1 ♀, 1 ♂, 1 ♂ ovig., 1 juv. LUYMUS Guyana Shelf Exped. Sta. 5: 06°36'N 53°33'W; 44 m; calcareous sand; 24-VIII-1970. (RMNH).—Guyana: 4 specimens. LUYMUS Guyana Shelf Exped. Sta. 74: 06°46'N 57°16'W; 27.5 m; muddy sand; 31-VIII-1970. (RMNH).—2 specimens. LUYMUS Guyana Shelf Exped. Sta. 94: 06°56'N 57°30'W; 26 m; mixed hard bottom; 2-IX-1970. (RMNH).—Saba Bank: 1 specimen: LUYMUS Saba Bank Exped. Sta. 59: 17°21'N 63°41'W; 37 m; sand, stones, shells, algae; 16-V-1972. (RMNH).

Remarks.—A common shallow-water species on both sides of the Atlantic. Fry & Hedgpeth attribute this species to the subgenus *Pigrolavatus*, which is neither diagnosed, nor is a type-species indicated. This means that this subgeneric name is unavailable.

Achelia gracilis Verrill, 1900

Achelia gracilis.—Hedgpeth, 1948: 244 (refs.).

Material.—Florida: 1 ♂, 2 ♀. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—Puerto Rico: 1 ♂. Combate; on cement pilings covered with algae, sponges, hydroids; 1-5 ft; 12-V-1967; V. A. Capriles coll. (ZMA).—1 ♀. Joyuda; on *Sargassum;* 20-IV-1967; V. A. Capriles coll. (ZMA).—St. John: 1 ♀. Hummelinck Sta. 1407: Turner Bay, E; *Chiton* zone; 18-VI-1955. (ZMA).

Remarks.—A rare species, previously recorded from Bermuda and Port Everglades, Florida (see Hedgpeth, 1948: 244), and doubtfully from the Bahamas (Giltay, 1934b: 5).

Achelia sp.

Material.—Florida: 1 juv. Hummelinck Sta. 1410A: Key Biscayne, North Point; on *Rhizophora*; 1-IX-1963. (ZMA).—Bonaire: 1 juv. Hummelinck Sta. 1566: Lac, Secu di Sorobon, 230 m N. of Sorobon Pt.; *Porites* flat, *Thalassia, Lithothamnion*; 10-50 cm; 21-VIII-1967. (ZMA).—Klein Bonaire: 1 juv. Hummelinck Sta. 1049B: E. coast at landing place; 13-IX-1948. (ZMA).

Remark.—These juveniles are unidentifiable.

Tanystylum geminum Stock, 1954
Fig. 10

Tanystylum geminum Stock, 1954a: 120-122, fig. 26; Bourdillon, 1955: 600-601, pl. III figs. 5-7.

Material.—Florida: 1 juv., probably this species. Hummelinck Sta. 1408A: Virginia Key, N.E. shore; 1.5-2 m; sea grass; rock; 4-IX-1963. (ZMA).—Puerto Rico: 1 ♂. Joyuda; on *Sargassum;* 20-IV-1967; V. A. Capriles coll. (ZMA).—Tamarinck, Guanica; on *Sargassum*; less than 2 ft; 31-X-1968; V. A. Capriles coll. (ZMA).—St. Martin: 2 ♂, 1 ♀. Hummelinck Sta. 1132: Simson Bay Lagoon, Flamingo Pond, W. shore; *Rhizophora, Avicennia*; soft mud; tidal and lower zone; 8-VI-1949. (ZMA).

Remarks.—The St. Martin specimens are topotypes. The original description can slightly be amplified, in that the legs of the male are somewhat more strongly armed than those of the female. The first coxa bears in male a strong anterior tubercle, almost absent in female. The spines on the male tibiae are longer than those in the female. See Fig. 10.

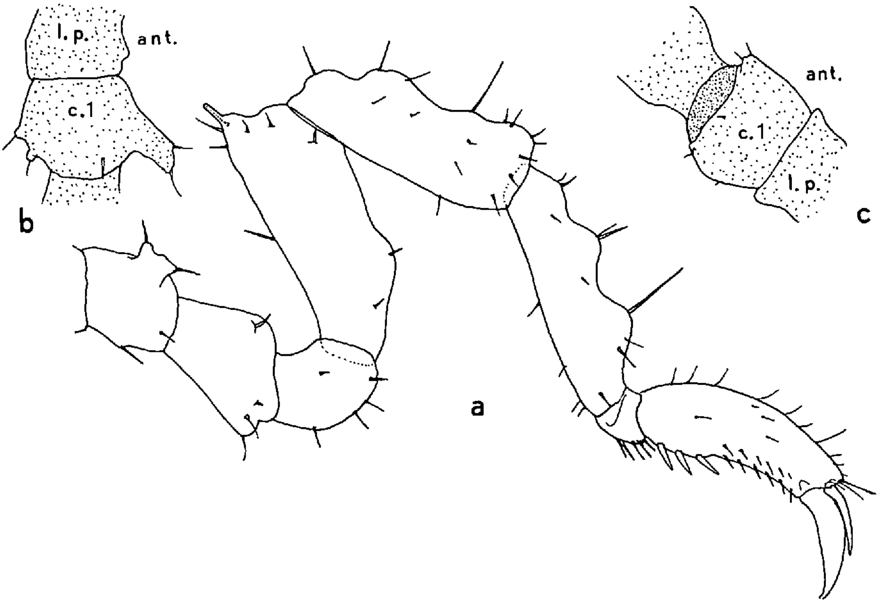

FIGURE 10. *Tanystylum geminum* Stock, 1954. a, third leg, ♂, front view (scale 6); b, coxa 1 of second leg, ♂, dorsal view (6); c, coxa 1 of second leg, ♀, dorsal view (6). (ant. = anterior side of appendage; c. 1 = coxa 1; 1. p. = lateral process). All from Tamarinck, Puerto Rico.

Tanystylum tubirostrum Stock, 1954

Tanystylum tubirostre Stock, 1954a: 117-120, figs. 24-25; Bourdillon, 1955: 600, pl. III figs. 2-4.

Material.—Puerto Rico: 1 ♂. Morrillos; on *Sargassum* sp.; depth less than 5 ft; 29-II-1968; V. A. Capriles coll. (ZMA).—Curaçao: 1 ♀, 2 ♂. St. Michiels Bay; on hydroids; abt. 1 m; 29-X-1958; J. H. Stock coll. (ZMA).

Remarks.—The auxiliary claws of these specimens are slightly variable in length: they are between ⅓ and ½ as long as the main claw.

Tanystylum isthmiacum ssp. *difficile* Stock, 1966

Tanystylum isthmiacum difficile Stock, 1966: 389-391, fig. 2 a-h; Fage & Stock, 1966: 318-319.

Material.—Brazil: 1 ♀. SALDANHA Sta. 1767B: 01°57.5′N 47°13.5′W; 93 m; 13-XI-1967 (= off the mouth of the Amazon River). (ZMA).—1 ♀. RECIFE Sta. 147: 08°00′S 34°32.9′W; 51 m (= off Recife de Pernambuco). (ZMA).

Remarks.—The present females resemble the holotype, likewise a female, in most respects. The shape of the proboscis is slightly variable, in the specimen from SALDANHA Sta. 1767B the tubiform distal part is very well demarcated. The specimen from RECIFE Sta. 147 has a slightly shorter abdomen than the holotype. The configuration of the palp is stable in all specimens found so far.

Tanystylum orbiculare Wilson, 1878

Tanystylum orbiculare.—Krapp, 1973 (lit., syn.)

Material.—Los Frailes (Venezuela): 14 ♂ (partly ovigerous), 3 ♀, 8 juv. Hummelinck Sta. 1215: La Pecha; rock debris; sand; 1-2 m; 19-VI-1936. (ZMA).

Remarks.—The present material corresponds with the form delimited under the name *T. orbiculare* (s.str.) by Krapp, 1973.

Although *T. hummelincki* is known from the same station (vide Stock, 1954a: 122), this species is not represented in the present lot. The two species are clearly distinct, in particular by the presence of a lateral expansion on the 7th oviger segment in the male of *T. hummelincki.*

Family Colossendeidae

Colossendeis macerrima Wilson, 1881

Fig. 11a-b

Colossendeis macerrima.—Bouvier, 1917: 10-13, pl. I fig. 1, pl. III figs. 1-2 (syn., refs.); Fry & Hedgpeth, 1969: 53 (refs.).
Colossendeis pennata Pushkin, 1970: 1490-1492, fig. 2 (nov. syn.).
Colossendeis spei Pushkin, 1970: 1494-1496, fig. 4 (nov. syn.).

Material.—Florida: 1 specimen. GERDA Sta. 181: 27°57'N 78°56'W-27°55'N 78°59'W; 779 m; 2-VII-1963. (ZMA).—1 specimen. GERDA Sta. 190: 25°57'N 78°07'W; 733-897 m; 4-VII-1963. (UMML).—2 specimens. GERDA Sta. 221: 24°21'N 80°35'W-24°23'N 80°30'W; 604-586 m; 22-I-1964. (UMML).—1 specimen. GERDA Sta. 289: 24°11'N 81°36'W-24°15'N 81°20'W; 604-597 m; 3-IV-1964. (ZMA).—1 specimen. GERDA Sta. 362: 24°10'N 81°42'W; 342 fms; 15-IX-1964. (UMML). —1 specimen. GERDA Sta. 365: 24°11'N 81°37'W-24°12'N 81°17'W; 672 m; 15-IX-1964. (ZMA).—1 specimen. GERDA Sta. 472: 24°17'N 83°00'W-24°14'N 82°56' W; 549-567 m; 25-I-1965. (ZMA).— 1 specimen. GERDA Sta. 475: 24°14' N 82°39'W-24°14'N 82°35'W; 550 m; 26-I-1965. (ZMA).—1 specimen. GERDA Sta. 484: 24°33'N 80°25'W-24°35'N 80°21'W; 403 m; 27-I-1965. (ZMA).—Venezuela: 9 specimens. PILLSBURY Sta. 479: 11°19.7'N 62° 03.1'-62°01.2'W; 121-131 m; 2-VIII-1966. (ZMA).—2 specimens. PILLSBURY Sta. 478: 11°34.4'N 62°10.7'W-11°32.0'N 62°07.2'W; 598-576 m; 2-VIII-1966. (UMML).—Guyana: 4 specimens. LUYMUS Guyana

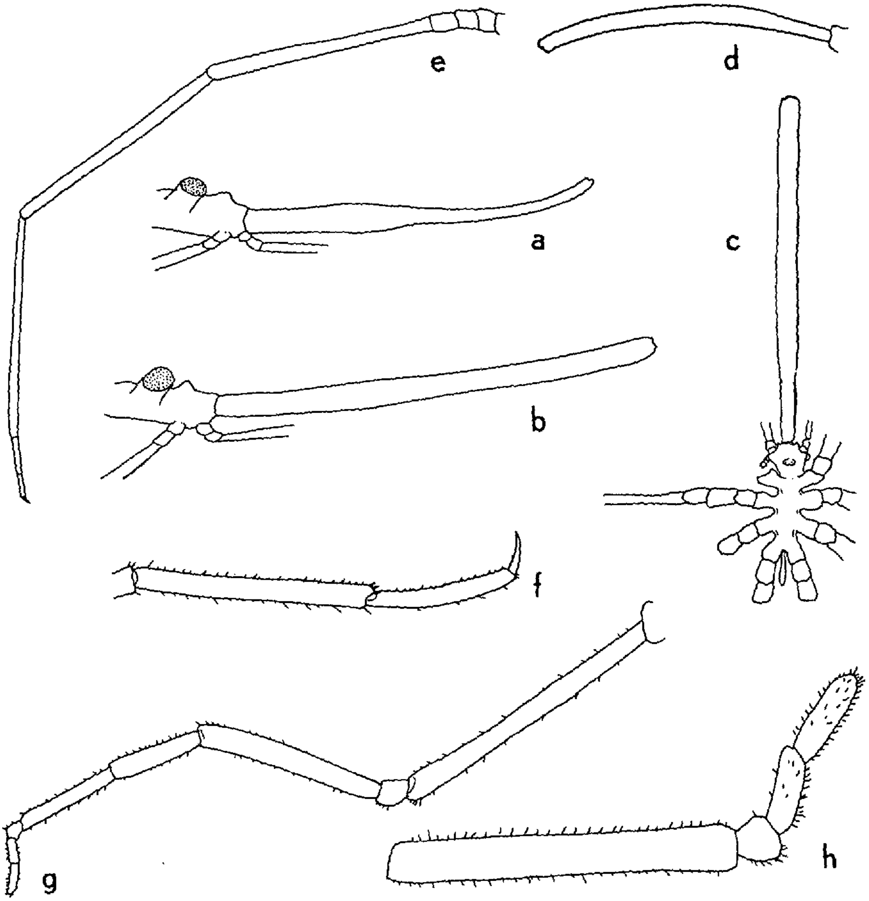

FIGURE 11a-b, *Colossendeis macerrima* Wilson, 1881. Head and proboscis from the right. Fig. 11a from PILLSBURY Sta. 526, Fig. 11b from PILLSBURY Sta. 447. c-f, *Colossendeis melancholicus* n. sp., holotype ♂. c, trunk and proboscis, dorsal; d, proboscis from the left; e, leg; f, distal leg segments. From GERDA Sta. 181. g-h, *Colossendeis gracilis* Hoek, 1881. g, palp; h, distal segments of palp. From Walda Sta. 06.

Shelf Exped. Sta. 80: 07°56′N 57°12′W; 618 m; muddy; 1-IX-1970. (RMNH).—3 specimens. LUYMUS Guyana Shelf Exped. Sta. 100: 08° 00′N 57°26′W; 500 m; muddy, 4-IX-1970. (RMNH).—Panamá (Atlantic coast): 1 specimen. PILLSBURY Sta. 447: 09°07.4′N 81°11.8′W-09° 04.0′N 81°13.8′W; 657-673 m; 21-VII-1966. (ZMA).—Gulf of Panamá: 2 specimens. PILLSBURY Sta. 526: 06°53′N 79°27′W-06°49′N 79°29′W; 3193-3200 m; 5-V-1967. (ZMA).

Remarks.—One of the specimens from PILLSBURY Sta. 526 has the proboscis very narrow, tubular, in its distal half. This distal part is more clearly curved upward than in typical *macerrima* (compare fig. 11a and b). A similar type of proboscis has been found in animals described as *Colossendeis macerrima minor* by Schimkewitsch, 1893, from the Pacific coast of the Americas, and as *Colossendeis gardineri* by Carpenter, 1907, from the Maldive Archipelago, the latter in 450 fathoms. Calman, 1923: 267 recorded similar forms also from the Arabian Sea, 636-719 fms. However, unlike Calman's specimens, the specimen with the "*gardineri*-type" of proboscis from PILLSBURY Sta. 526 has a 3rd palp segment of 4.6 mm long, and a 5th of 8.4 mm, whereas a specimen from PILLSBURY Sta. 447 (which is otherwise of about the same size as the specimen from Sta. 526) has the 3rd and 5th palp segments of 3.15 and 5.5 mm, respectively.

For the moment, I follow Calman, and consider these different forms to belong to one, variable, species, C. *macerrima.*

The 9 specimens from PILLSBURY Sta. 479 (N.W. of Trinidad) came from exceptionally shallow waters (121-131 m), unless they were clinging to the net used at the previous station, Sta. 478, which yielded also *C. macerrima.* Fry & Hedgpeth, 1969, consider 400-3670 m the normal bathymetrical range for this species, although they cite two records, considered doubtful, from 79 and 139 m, respectively. The high number of specimens (nine) taken at PILLSBURY Sta. 479 makes it rather unlikely that a confusion has occurred.

Colossendeis minuta Hoek, 1881

Colossendeis minuta.—Stock, 1963: 326-328, fig. 4 (refs.).

Material.—Atlantic Ocean (Walvis Ridge): 1 specimen. J. CHARCOT, cruise Walda, Sta. 08 (sample CY 07): 22°53'S 11°56.2'E; 2840 m; VII-VIII-1971. (ZMA).—Gulf of Panamá: 1 specimen. PILLSBURY Sta. 526: 06°53'N 79°27'W-06°49'N 79°29'W; 3193-3200 m; 5-V-1967. (UMML).

Remark.—A deep-water species known from both the Pacific and Atlantic oceans.

Colossendeis colossea Wilson, 1881.

Colossendeis colossea.—Fry & Hedgpeth, 1969: 53 (refs.).

Material.—Atlantic Ocean (Walvis Ridge): 1 specimen. J. CHARCOT cruise Walda Sta. 06 (sample CY 05): 21°46.3'S 11°08.3'E; 2930 m; VII-VIII-1971. (ZMA).—Gulf of Panamá: 1 specimen. PILLSBURY Sta. 526: 06°53'N 79°27'W-06°49'N 79°29'W; 3193-3200 m; 5-V-1967. (UMML).

Remark.—A fairly common abyssal and bathyal species taken in all major ocean basins.

Colossendeis melancholicus n. sp.

Figs. 11c-f, 12

Material.—Grand Bahama: 1 ♂ holotype. GERDA Sta. 181: 27°57′N 78°56′W-27°55′N 78°59′W; 779 m; 2-VII-1963. (USNM).

Description.—A gigantic *Colossendeis*: span of the legs 410 mm. Lateral processes well-separated, by about half their own diameter. Cephalic segment with 2 minute anterior knobs. Ocular tubercle conical; only the anterior eyes present, but poorly pigmented; lateral sense organs at the basis of the anterior eyes, distinct. Abdomen reaching beyond the distal end of coxa 1 of leg 4.

Proboscis of almost even diameter throughout its length; only the basal part is slightly narrower. In lateral view, the proboscis is regularly curved downward.

The palp has about equal 3rd and 5th segments. Of the distal 5 segments, segment 7 is the longest.

The oviger has no subchelate distal end. The oviger spines are all of a leaf-like (or spatulate) shape; there are numerous irregular rows of spines.

The legs are glabrous. Femur and tibia 1 are of equal length, tibia 2 is slightly shorter. The tarsus is almost twice as long as the propodus; both segments bear a row of spinules on the ventral side. Claw short. Genital pores on the ventral surface of coxa 2 of all legs.

Remarks.—At the first glance, this specimen looks like a gigantic *Colossendeis macerrima*, an impression that is produced by the long and slender proboscis and by the relative proportions of the distal leg segments. The size falls, however, far outside the range for *macerrima* (cf. Fry & Hedgpeth, 1969: 53). So, the maximum trunk length recorded by Fry & Hedgpeth is 13 mm for *macerrima*, whereas in the present specimen it is 26 mm.

At closer inspection, the present material differs from *macerrima* in several respects: the downcurved proboscis (upcurved in *macerrima*), the equal length of palp segments 3 and 5 (5th almost twice as long as 3rd in *macerrima*), the more slender distal palp segments, the spatulate oviger spines (needle-like in *macerrima*), the less spaced lateral processes, etc.

The equal length of palp segments 3 and 5 is reminiscent of *Colossendeis colossea* Wilson, 1881, but by the tubular (= not widened) proboscis and by the short length of palp segment 7 (which is very elongated in *colossea*), the present material is clearly distinguished.

One might for a moment also think of the rather ghosty "intermediate" between *C. colossea* and *C. macerrima*, described by Hoek (1881) as *C. gigas-leptorhynchus*, which is in reality not an intermediate at all, but a distinct species, *C. cucurbita* Cole, 1909 (vide Fage, 1956c). *C. cucurbita* differs from the present material in the 3rd and 8th palp segments (which

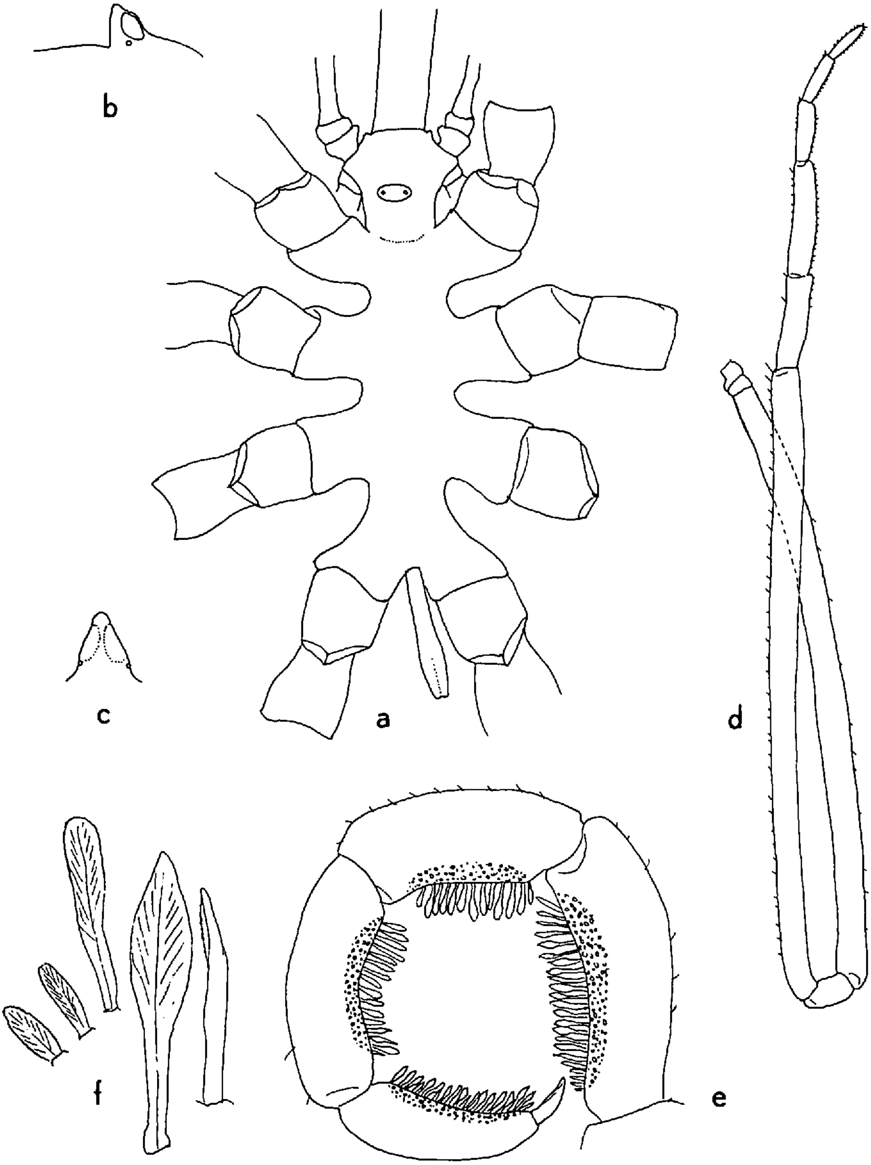

FIGURE 12. *Colossendeis melancholicus* n. sp., holotype ♂. a, trunk, dorsal; b, ocular tubercle from the right; c, ocular tubercle, frontal; d, palp; e, distal portion of oviger (only the main row of compound spines is drawn, of the other rows only the implantation of the spines is indicated); f, some forms of compound spines. All from GERDA Sta. 181.

are short in *cucurbita*), and in the different shape of the proboscis (widened in the center and upcurved in *cucurbita*).

Another brachytarsal species that should be compared with the present material is *Colossendeis orientalis* Losina-Losinsky, 1958 (in which the tarsus is shorter than the propodus and palp segment 5 shorter than 3). *Colossendeis nasutus* Hedgpeth, 1949, has a proboscis that somewhat resembles that of the present material, but *nasutus* is a longitarsal species. *Colossendeis bicincta* Schimkewitsch, 1893, may be similar to the present species, except for the shape of the proboscis.

Since the present material can not be attributed to any described form, it is considered a new species. Unfortunately, the holotype (and single specimen known) was preserved in formalin and thus is now in a somewhat brittle condition. The drooping nose of the specimen gave rise to the specific name proposed: *melancholicus*.

Measurements of the holotype in mm are: length trunk (frontal margin cephalic segment to tip of 4th lateral process, 26; width across 2nd lateral processes, 8; length proboscis, 55; and greatest diameter proboscis, 2.8.

Measurements of the palp segments in mm are: segment 1, 1.0; segment 2, 0.4; segment 3, 26.2; segment 4, 2.2; segment 5, 26.0; segment 6, 4.0; segment 7, 4.8; segment 8, 2.4; segment 9, 2.0; and segment 10, 2.0.

Measurements of the leg in mm are: coxa 1, 3.0; coxa 2, 3.0; coxa 3, 4.0; femur, 59; tibia 1, 59; tibia 2, 55; tarsus, 11; propodus, 5.6; and claw, 1.5

Colossendeis gracilis Hoek, 1881

Fig. 11g-h

Colossendeis gracilis.—Stock, 1963: 330 (refs.).

Material.—Atlantic Ocean (Walvis Ridge): 26 specimens. J. CHARCOT cruise Walda Sta. 06 (sample CY 05): 21°46.3'S 11°08.3'E; 2930 m; VII-VIII-1971. (ZMA). Moreover 2 specimens from Walda Sta. 32 (sample CY 005), same locality, but 2953 m. (ZMA).—Gulf of Panamá: 5 specimens. PILLSBURY Sta. 526: 06°53'N 79°27'W-06°49'N 79°29'W; 3193-3200 m; 5-V-1967. (UMML).

Remarks.—Fry & Hedgpeth, 1969: 52-53 consider this species identical with *C. angusta* Sars, 1877. My reasons (brought forward in my 1963 paper) to keep the two species apart, are not invalidated by the present records. The distal three palp segments combined are about 60 percent of the length of segment 7 (Fig. 11h), whereas Sars (1891, pl. XV fig. 2e) illustrates segments 8 + 9 + 10 of about equal in length to segment 7 for *C. angusta*.

C. gracilis is a deep-sea species from tropical regions and the southern hemisphere.

Rhopalorhynchus claudus n. sp.

Fig. 13

Material.—Barbados: 1 ♀ (holotype). Hummelinck Sta. 1442: 0.5 mi. off Holetown; 100 m; muddy sand, shell debris; sponge bottom; 19-II-1964. (ZMA).

Description.—The holotype, and unfortunately the only specimen available, is rather mutilated: it lacks the proboscis, one of the palps, one of the ovigers, and 6 of the 8 legs.

The neck is slightly longer than in other species of the genus, devoid of anterior protuberances. The trunk is completely segmented; the lateral processes 1 and 2, and 2 and 3 are separated by enormous intervals, that are 4 to 5 times the diameter of the corresponding crurigers. Abdomen minute, bent ventrad. Ocular tubercle with a more or less cylindrical basal part, swollen eyes, above the eyes tapering into a tall point, which is curved slightly anteriad.

Implantations of palp and oviger placed near the anterior margin of the neck. Palp 10-segmented, segments 3 and 5 very elongated. Segment 6 slender, about 20 per cent shorter than segment 7. Segments 8 and 9 slender, subequal; segment 10 very slender, slightly shorter than segment 9.

Oviger with extremely slender 4th and 6th segments. Terminal claw short, not very pointed. Oviger spines in several, irregular rows; very numerous.

Legs with short, almost knob-like, coxae. Femur strongly club-shaped (sexual character). Tibia 1 the longest segment. The tarsal ratio [= (tarsus + propodus + claw) : tibia 2] in leg 2 is about 55 percent (this species is consequently brachytarsal). Tarsus distinctly shorter than the propodus; claw half as long as the propodus. Tarsal and propodal soles armed with densely set, short spinules. Genital pores on coxa 2 of legs 1 and 2 (these are the only two available legs).

Remarks.—Although the only specimen available is in a rather damaged state, I cannot withstand describing it as a new species, since this is the first Antillian *Rhopalorhynchus*. It is apparently closely related to the Indo-West Pacific *kroyeri*-group of the genus (cf. Stock, 1958b), and not to the *articulatus*-group, which is predominantly North-Pacific, with one member in the eastern Atlantic (cf. Stock, 1970). The main differences between these two species-groups lie in the structure of the proboscis, and since this part of the body is lacking in the present Caribbean specimen, it cannot be attributed with certainty to any of these two species-groups. It agrees, however, with the *kroyeri*- group in two additional, probably significant, characters, viz., the club-shaped female femora, and the extreme elongation of the trunk segments. All members of the *articulatus*-group are more compactly built.

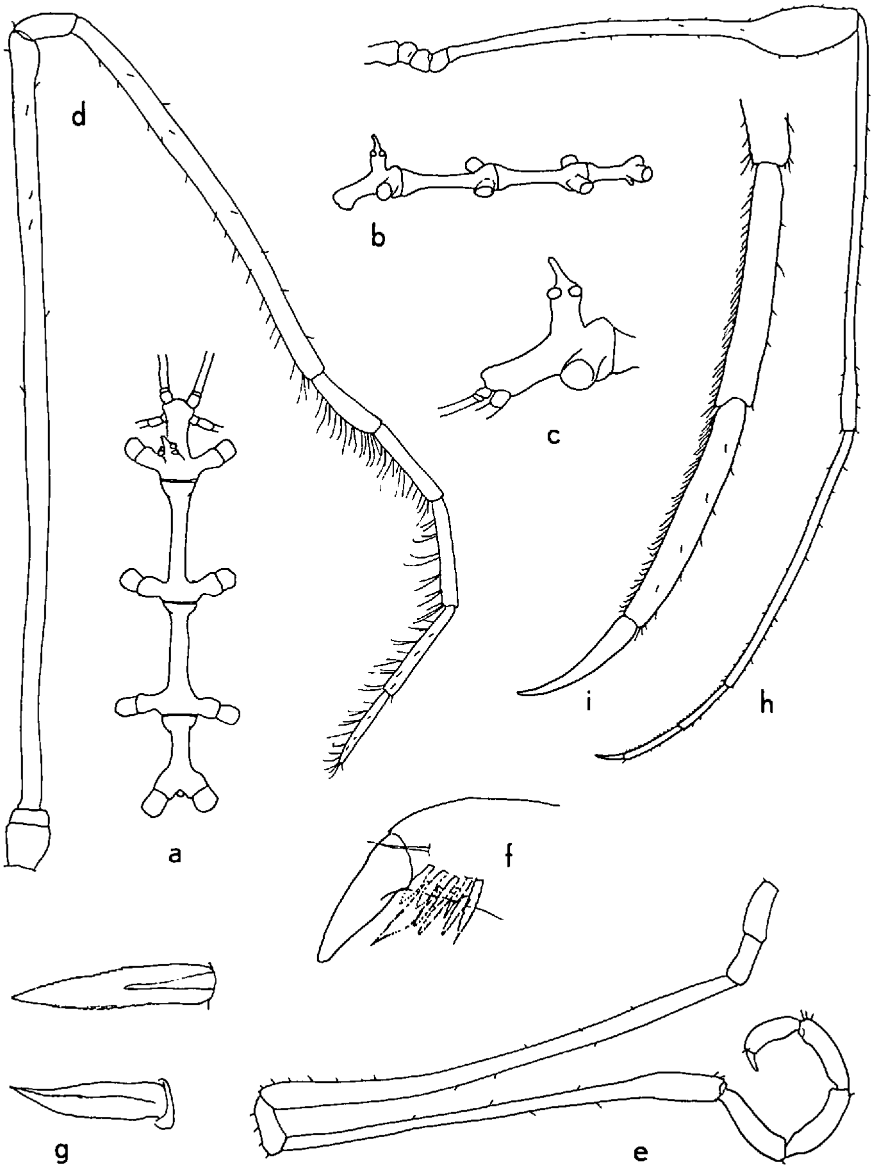

FIGURE 13. *Rhopalorhynchus claudus* n. sp., holotype ♀. a, trunk, dorsal (free-hand sketch); b, trunk from the left (free-hand sketch); c, cephalic segment from the left (free-hand sketch); d, palp (scale 12); e, oviger (1); f, tip of oviger (11); g, two compound oviger spines (free-hand sketch); h, second leg (3); i, distal segments of 2nd leg (12). From Hummelinck Sta. 1442.

In the *kroyeri*-group, 4 species share the brachytarsal condition with the present species: *Rh. pedunculatus* Stock, 1957a, *Rh. clavipes* Carpenter, 1893, *Rh. gracillimus* Carpenter, 1907, and *Rh. mortenseni* Stock, 1958b.

Of these, *Rh. pedunculatus* has a much shorter 6th palp segment, and a less slender 10th palp segment than the Caribbean form. *Rh. clavipes* and *Rh. gracillimus* have likewise less slender distal palp segments. Only *Rh. mortenseni* approaches in the structure of the palp the present species. All Indo-Pacific species have, however, a shorter neck than the Caribbean material. Further differences can be found in the shape of the ocular tubercle (less tall in the Indo-Pacific species), in the length of the claw (proportionally shorter in *pedunculatus* and *gracillimus*), and in the length of the tarsus (proportionally longer in *mortenseni*).

Derivatio nominis.—*claudus* (latin) = incomplete, alluding to the mutilated state of the holotype.

Measurements of the holotype in mm are: trunk segment 1, 0.79; trunk segment 2, 1.19; trunk segment 3, 1.12; trunk segment 4 (to tip of 4th lateral process), 0.58; width across 3rd lateral processes, 0.76; distal diameter 2nd lateral process, 0.20; space between lateral processes 2 and 3, 0.97; palp segments 1 + 2, 0.15; palp segment 3, 2.13; segment 4, 0.15; segment 5, 1.40; segment 6, 0.21; segment 7, 0.25; segment 8, 0.27; segment 9, 0.27; and segment 10, 0.25.

Measurements of the oviger segments are: segment 2, 0.23; segment 3, 0.18; segment 4, 1.73; segment 5, 0.18; segment 6, 1.65; segment 7, 0.28; segment 8, 0.27; segment 9, 0.26; segment 10, 0.23; and the oviger claw, 0.05.

Measurements in mm of the second leg are: coxa 1, 0.18; coxa 2, 0.25; coxa 3, 0.23; femur, 4.28; tibia 1, 4.33; tibia 2, 3.28; tarsus, 0.65; propodus, 0.75; and claw, 0.38.

Pantopipetta brevicauda Stock, 1963

Pantopipetta brevicauda Stock, 1963: 336-338, figs. 9, 10a; Hedgpeth & McCain, 1971: 223-226, figs. 1, 3, 4.

Material.—Atlantic Ocean (Gulf of Guinea): 1 ♂. J. CHARCOT cruise Walda Sta. 37 (sample DS 29): 02°57'N 04°28.1'N; 3547 m; VII-VIII-1971. (ZMA).—Atlantic Ocean (Walvis Ridge): 1 ♀. J. CHARCOT cruise Walda Sta. 06 (sample DS 05): 21°45'S 11°07.8'E; 2992 m; VII-VIII-1971. (ZMA).

Remarks.—The present two specimens differ from the original description in that the abdomen reaches beyond the distal end of coxa 1 of leg 4, to about the proximal third of coxa 2. Similar variations in the length of the abdomen have been recorded by Hedgpeth & McCain, 1971: 221.

The record from Walda Sta. 37 extends the range of this species, which was hitherto known from the southern Atlantic Ocean and the south-eastern Pacific Ocean, to the northern hemisphere.

The assignment of *Pantopipetta* to the Colossendeidae is still a matter of discussion. As a matter of fact, as Hedgpeth & McCain stressed, the similarity of the genus to the Austrodecidae is also striking. Since both points of view seem to make sense, they may be indicative of the fact that Colossendeidae and Austrodecidae form in reality one family.

Family Nymphonidae

Nymphon stromi Krøyer, 1844

Principal refs.—Hedgpeth, 1948: 190 (as *N. strömi*).

Material.—Florida: 1 ♀. GERDA Sta. 154: 26°18′N 79°22′W-26°29′N 79°20′W; 549 m; 25-VI-1963. (UMML).—1 ♂ ovig. GERDA Sta. 170: 27°06′N 79°32′W-27°11′N 79°30′W; 677-659 m; 29-VI-1963. (ZMA).—2 ♀. GERDA Sta. 311: 25°41′N 79°31′W-25°47′N 79°34′W; 805-787 m; 24-V-1964. (ZMA).—1 ♀. GERDA Sta. 354: 25°39′N 79°32′W-25°42′N 79°30′W; 805-830 m; 24-VIII-1964. (ZMA).—1 specimen. GERDA Sta. 672: 27°53′N 79°03′W; 796 m; 18-VII-1965. (RMNH).

Remarks.—These records extend the range of the species some 5° more southward. The southernmost records hitherto were Hedgpeth's (1948) ALBATROSS Stations 2415, 2666, and 2667, all around 30-31°N.

Nymphon floridanum Hedgpeth, 1948

Figs. 14-15

Nymphon floridanum Hedgpeth, 1948: 196-199, fig. 17 (p.p., only the long-necked form); Stock, 1955b: 215, fig. 1a (p.p., only the long-necked form).

Material.—Florida: 1 ♂ (holotype), 1 ♀ (paratype). Dry Tortugas, 5 mi. S. of Loggerhead Key; 7-10 fms; 20-VII-1924; W. L. Schmitt coll. (USNM 81093 and 124017)—Puerto Rico: 1 juv. Edge of the shelf off La Parguera; 20-35 m; on sponge; 3-III-1963; J. H. Stock coll. (ZMA).—1 ♀. Hummelinck Sta. 1423A: Bahía Fosforescente, S.W.; 1 m; sandy; *Thalassia* and *Halimeda*; 17-IX-1963. (ZMA).—Virgin Islands: 1 ♂. N. of Loanga; 18 fms; 22-XII-1905; Th. Mortensen coll. (ZMK).—1 ♀. Same locality as previous record. (ZMA).—2 ♀. Between Jost van Dyke and Loanga; 16 fms; 13-III-1906; Th. Mortensen coll. (ZMK).—French Guiana: 4 juv. LUYMUS Guyana Shelf Exped. Sta. 5: 06°36′N 53°33′W; 44 m; calcareous sand; 24-VIII-1970. (RMNH).—1 ♀, 1 juv. LUYMUS Guyana Shelf Exped. Sta. 21: 06°03′N 53°12′W; 42 m; sandy mud; 26-VIII-1970. (RMNH).—Guyana: 1 ♂, 1 juv. LUYMUS Guyana Shelf Exped. Sta. 112: 07°24′N 57°36′W; 39 m; muddy sand; 5-IX-1970. (RMNH).—

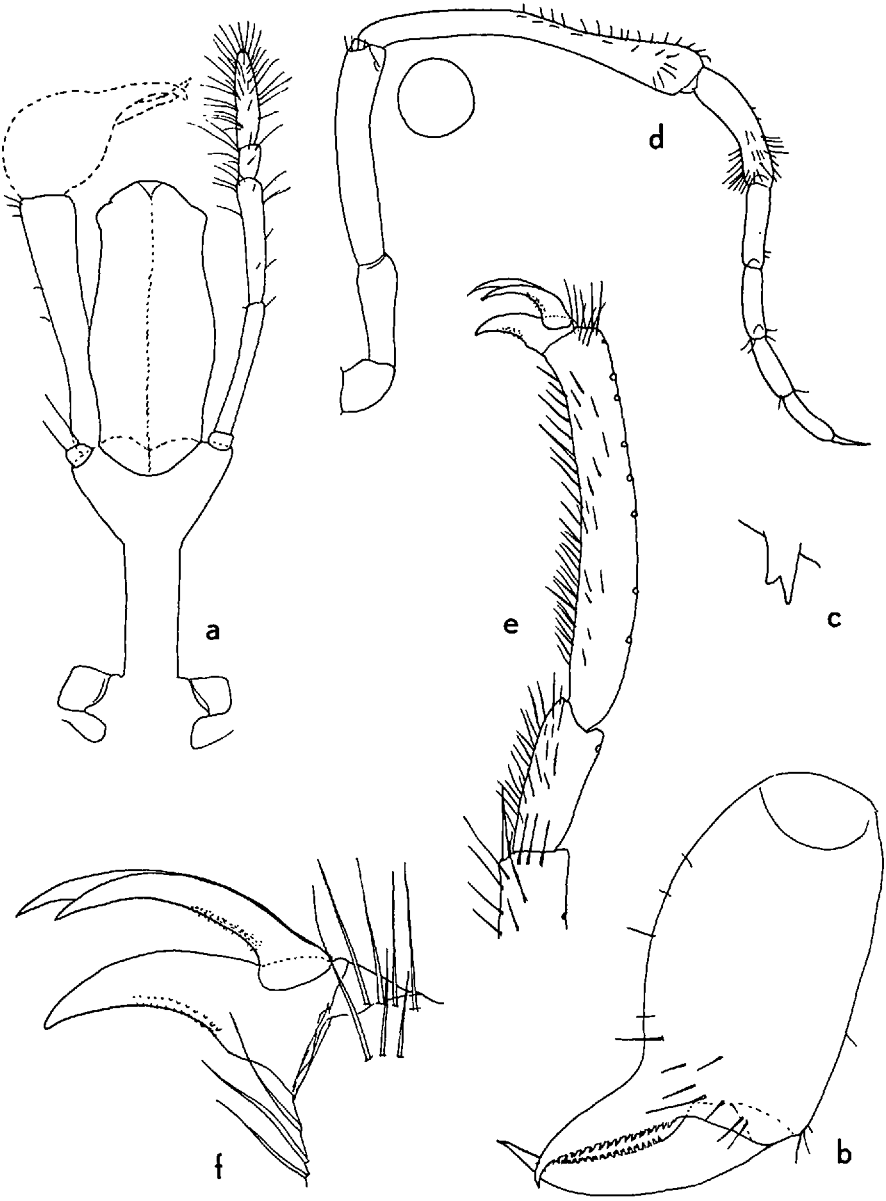

FIGURE 14. *Nymphon floridanum* Hedgpeth, 1948, holotype ♂. a, anterior part of body, ventral (scale 1); b, chela (9); c, one of the teeth of the movable finger, enlarged; d, oviger (1); e, distal segments of leg 1 (9); f, claw and auxiliary claws of leg 1 (32). All from 5 mi. S. of Loggerhead Key, Fla.

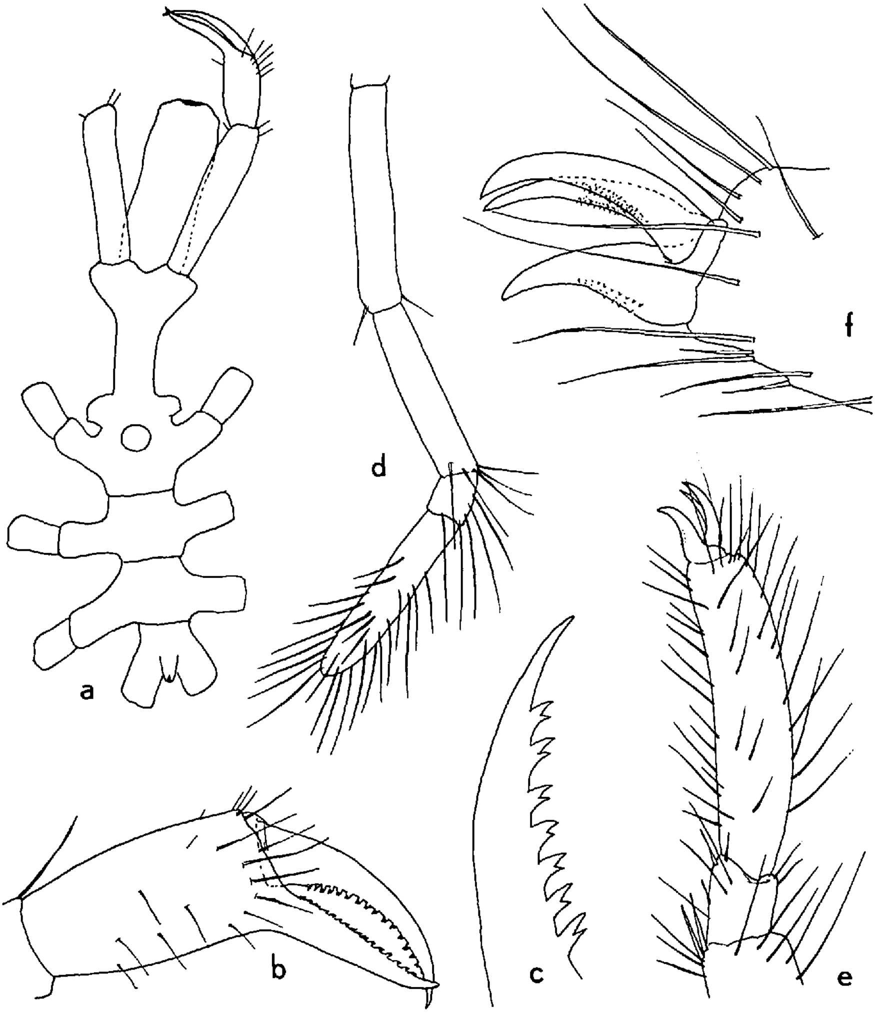

FIGURE 15. *Nymphon floridanum* Hedgpeth, 1948, ♀ (young ?). a, trunk, dorsal (scale 1); b, chela (6); c, tip of movable finger (11); d, palp (6); e, distal segments of leg 3 (6); f, claw and auxiliary claws (11). All from N. of Loanga (Virgin Is.).

Gulf of Mexico: 2 ♂. ALBATROSS Sta. 2405: 28°45'N 85°02'W; 30 fms; 15-III-1885. (USNM).

Remarks.—Hedgpeth (1948: 198) noticed already that part of the material on which he based his *Nymphon floridanum* varied from the types in that the neck was about half as long. Similar dimorphism was found by Stock, 1955b. Since no other differences were found at that time, it was presumed that one, variable species was concerned. A closer study of the present material, however, revealed several additional differences between the long- and the short-necked form, especially in the armature of the fingers of the chela, and I have no doubt that two good species are involved.

The next problem was to decide which of the two species had to bear the name *N. floridanum.* Hedgpeth's original figures seem to be composite: his figures 17a, b, and d were in all probability made of the one species, his figs. 17e and g of the other. The chela (Hedgpeth, fig. 17c), which shows—as mentioned—the most salient differences, has in the original figure the number of teeth of species 1, but the shape of the teeth as in species 2.

Thanks to the courtesy of Dr. C. A. Child of the Smithsonian Institution, I have been given an opportunity to re-examine Hedgpeth's samples, including the types. Fortunately, the holo- and paratype belong to one species, and I have fixed the name *floridanum* to the specimens that agree with this type material.

In short, *N. floridanum* s.str. is characterized by its long neck (in adults), which has a parallel-sided stretch between the crop and the oviger implantation. Both fingers of the chela bear 15 to 19 teeth; these teeth are short and bicuspidate (except sometimes the most proximal teeth that are short but simple). The distal palp segment is very slender, subequal to segment 3. The propodus is little curved, the claw is short and robust (Hedgpeth calls it "triangulate"). The proboscis is roughly cylindrical, more than twice as long as wide, and slightly constricted near the distal end, which causes a kind of angular appearance. The 4th oviger segment (♂) is slender.

The type specimens deviate in several respects from the description and figures in Hedgpeth's paper. So, the teeth on the fingers are bicuspidate instead of simple. The 3rd and 4th palp segments are not subequal, as the description says, but the 3rd is subequal to the 5th. The legs are carrying long setae, in particular on the propodus and on tibia 2, in lesser extent also on the femur and tibia 1. In the holotype, it is true, several of these setae are broken off (although the scars are still visible), but long setation is present in several other lots belonging to the original set of samples. Hedgpeth's fig. 17f does not show any setae at all, and is misleading in this respect.

The compound spine formula of the holotype is 14 : 13 : 13 : 13. The terminal oviger claw is armed with very fine setules.

A most curious character of *N. floridanum,* not stressed in the previous descriptions, is the presence of several rows of rugosities on the inner margin of both the claw and the auxiliary claws. (This character is shared by its sibling species, *N. aemulum,* described in the sequel.) It may be remarked parenthetically that a pectinated claw is also found in *Nymphon* *giraffa* Loman, 1908 (see Stock, 1973, fig. 3f), an Indo-West Pacific species that is rather close of *Nymphon floridanum* in other respects as well. As in the *N. giraffa/aequidigitatum*-complex, there are indications that the palm of the chela is sexually dimorphic in *N. floridanum* as well (palm slightly more swollen in ♂ than in ♀).

The length of the tarsus, propodus, and claw appears (as in most *Nymphon* species) to vary with the age. In younger specimens, these articles are shorter and less elongate than in entirely full-grown specimens. Also the neck is shorter in juveniles.

Nymphon aemulum n. sp.

Figs. 16-17

Nymphon floridanum (pro parte).—Hedgpeth, 1948: 196-198 (only the short-necked form); Stock, 1955b: 215 (only the short-necked form).

Material.—Antigua: 1 ♀ (holotype). Hummelinck Sta. 1540B: Dickinson Bay; eroded *Thalassia* flat; 0.5 m; 26-VII-1967. (ZMA).—Virgin Islands: 1 ♂ (allotype). St. Thomas Harbour; I-1896; Chr. Levinsen coll. (ZMK).

Other records.—Florida: 1 ♀. Hummelinck Sta. 1413: E. of Soldier Key; 2 m; 5-IX-1963. (ZMA).—1 specimen. Dry Tortugas; surface tow; 22-IV-1906; L. J. Cole coll. (USNM).—1 ♀. Same data as previous record, but 21-IV-1906. (USNM).—1 ♀. Same data as previous record, but 19-IV-1906. (USNM).—Puerto Rico: 1 ♀. Margarita Reef (S.W. of La Parguera); on red sponge; 6-8 m; 2-I-1963; J. H. Stock coll. (ZMA).—Virgin Islands: 1 ♀. S. of St. Croix; inside coral reefs; sand; 3 fms; 13-II-1906; Th. Mortensen coll. (ZMK).—1 juvenile. Off Whistling Island (St. Jan); 16 fms; 17-III-1906; Th. Mortensen coll. (ZMK).—1 juvenile. Danish West Indies (without further particularities); 12-II-1914. (ZMK).—Barbuda: 1 ♀. Hummelinck Sta. 1394. Martello Tower Beach; 8-VII-1955. (ZMA).—Antigua: 1 ♀. Hummelinck Sta. 1393: Deep Bay at Fort Barrington; 17-VII-1955. (ZMA).—Surinam: 1 ♂ ovig., 2 ♀. O.C.P.S. II Station unknown, 1969 (this expedition worked on the eastern part of the coast of Surinam, approx. between 54° and 55° W, 0-100 m). (RMNH).

Description.—Very similar to *Nymphon floridanum* Hedgpeth, 1948, but the neck is distinctly shorter; the wide crop tapers gradually to its most narrow part, just in front of the oviger implantation; thus the neck lacks a parallel-sided portion.

The proboscis is barrel-shaped, less than twice as long as wide, and not angular at the distal end.

The fingers of the chela bear long (longer than the diameter of the finger), needle-shaped spines, usually 9 to 10 on each finger, rarely up to 15.

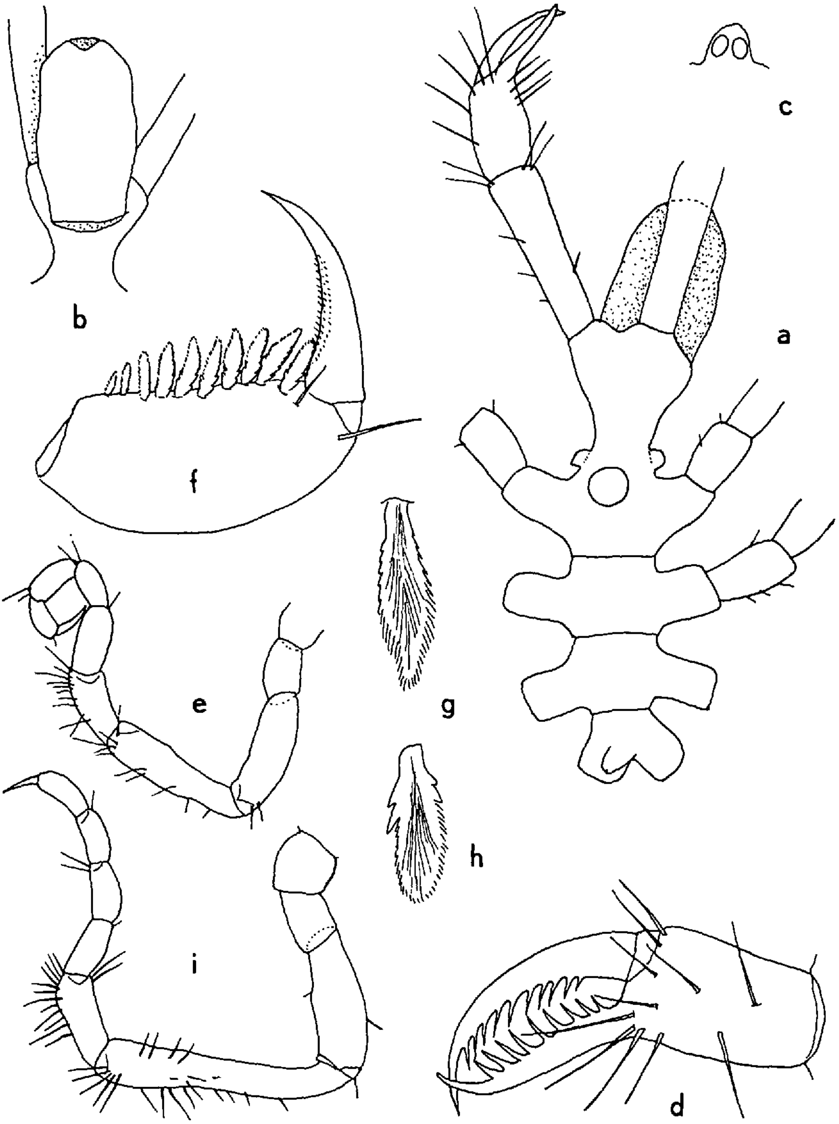

FIGURE 16. *Nymphon aemulum* n. sp.; a-h, holotype ♀; i, allotype ♂. a, trunk, dorsal (scale 12); b, proboscis, ventral (12); c, ocular tubercle from the left (free-hand sketch); d, chela (6); e, oviger (12); f, distal portion of oviger (11); g, compound spine from oviger segment 7 (13); h, same from segment 10 (13); i, oviger (12). Fig. 16a-h from Hummelinck Sta. 1540B, i from St. Thomas Harbour (Virgin Is.).

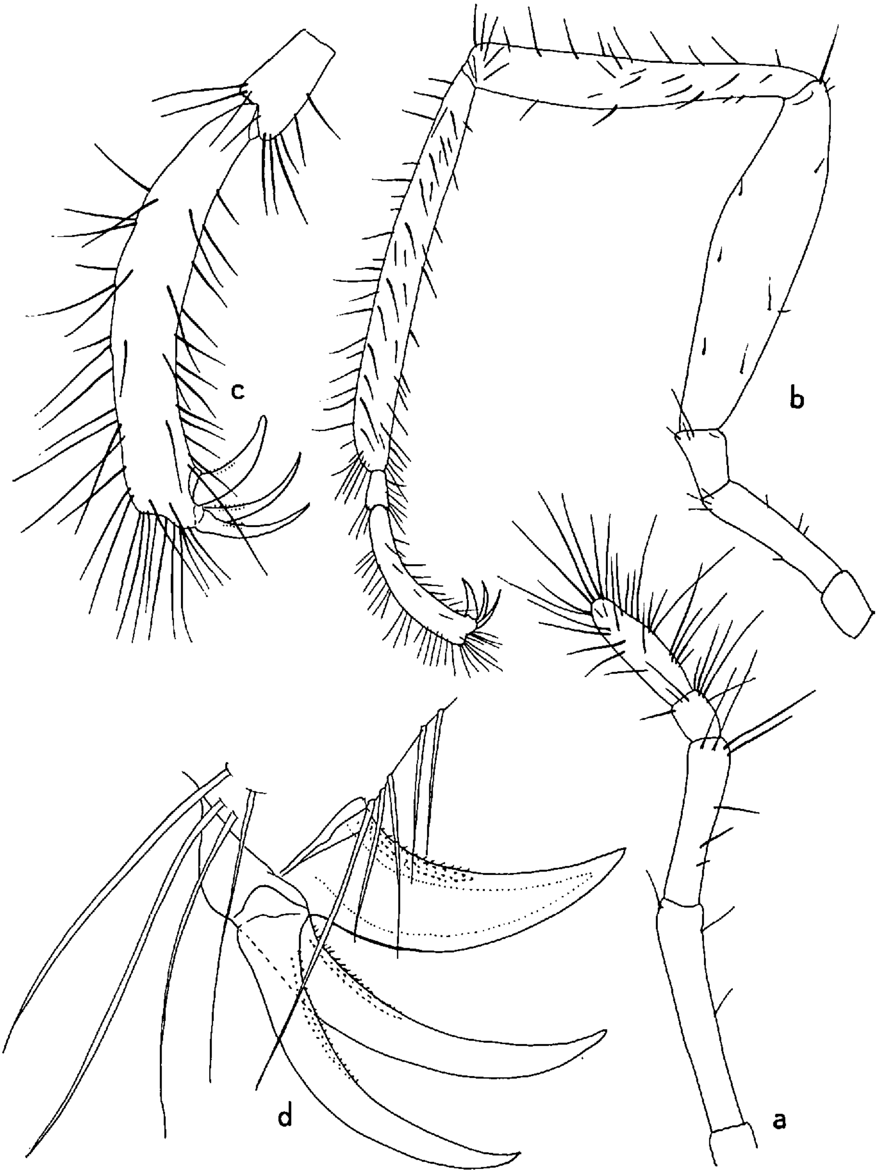

FIGURE 17. *Nymphon aemulum* n. sp., holotype ♀. a, palp (scale 6); b, third leg (1); c, distal segments of 3rd leg (6); d, claw and auxiliary claws (11). All from Hummelinck Sta. 1540B.

The distal palp segment is less slender than in *N. floridanum*, shorter than segment 3.

In the ♂ oviger, segment 4 is short and robust, hardly more than twice as long as wide; segment 5 is also shorter in comparison with *N. floridanum*, as is segment 6. The compound spine formula of the ♀ holotype is 12 : 11 : 10 : 10, of the ♂ allotype 13 : 10 : 13 : 10. The terminal oviger claw is untoothed, but provided with a stretch of minute rugosities. The compound spines are variable in shape, even in the same specimen; some spines have 1 or 2 basal teeth, some other spines are devoid of such teeth; the distal part of the compound spine is ornamented with numerous denticles of the callipallenid type.

The legs bear long setae, in particular on the distal segments. Cement gland pores are very hard to discover, probably about 10 in number. The propodus is slightly more curved than in *N. floridanum*. The claw is less triangulate, more slender. Both the claw and the auxiliaries bear a patch of rugosities on their inner margin.

Measurements of the holotype in mm are: length of trunk (frontal margin neck to tip of 4th lateral process), 1.40; width across 2nd lateral processes, 0.60; length proboscis (ventral), 0.59; greatest diameter proboscis, 0.31; length scape, 0.48; and length chela, 0.55.

Measurement of the third leg in mm are: coxa 1, 0.23; coxa 2, 0.50; coxa 3, 0.23; femur, 1.25; tibia 1, 1.15; tibia 2, 1.50; tarsus, 0.11; propodus, 0.53; claw, 0.14; and auxiliary claws, 0.15.

Remarks.—As explained under *Nymphon floridanum*, this is a sibling-species of it. Both were hitherto confused, but there are numerous small differences between the two. The most distinct differences are found in the shape of the neck and in the armature of the chela.

Both *N. aemulum* and *N. floridanum* are shallow-water species known from the Caribbean, Florida, and adjacent waters. The former is moreover known from plankton tows.

Derivatio nominis.—*aemulum* (latin) = competitive, emulous, alluding to the close morphological similarity to *N. floridanum*.

Nymphon adami Giltay, 1937
Figs. 18, 19a-d

Nymphon adami Giltay, 1937: 84-87, figs. 2-5; Fage, 1956b: 290-291, fig. 1; Fage, 1959: 236, fig. 1a; Stock, 1967: 47.

Material.—Nigeria: 1 ♂ ovig., 1 ♀. PILLSBURY Sta. 248: 04°03′N 05°41′ E-04°07′N 05°40′E; 33 m; 13-V-1965. (UMML).—Ivory Coast: 1 ♂. Off Sassandra; 3-IV-1964. (RMNH).

Remarks.—A couple of new illustrations of structural details have been inserted in the present paper.

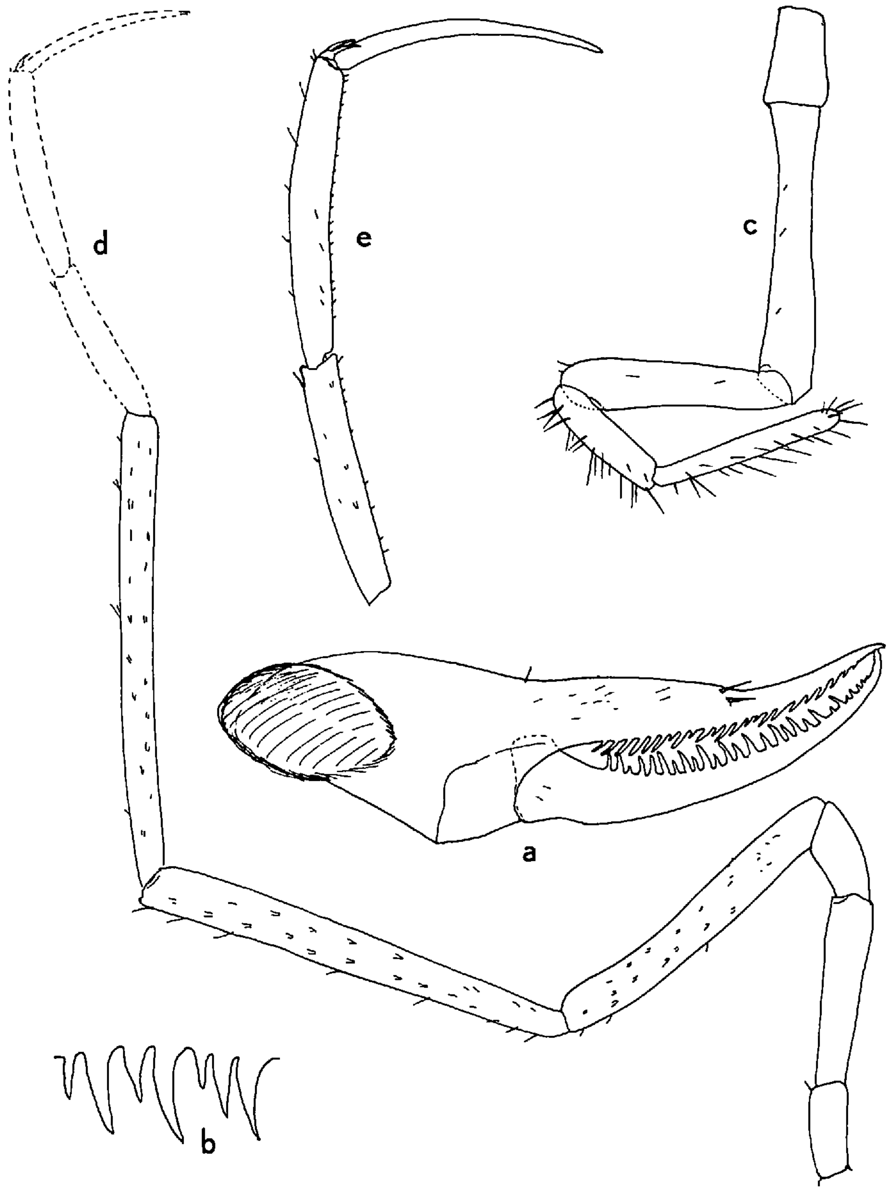

FIGURE 18. *Nymphon adami* Giltay, 1937. a, chela, ♀ (scale 1); b, detail of the chelar teeth; c, palp ♀ (1); d, first leg, ♂ (14); e, distal segments of first leg, ♂ (15). ♀ from PILLSBURY Sta. 248, ♂ from off Sassandra.

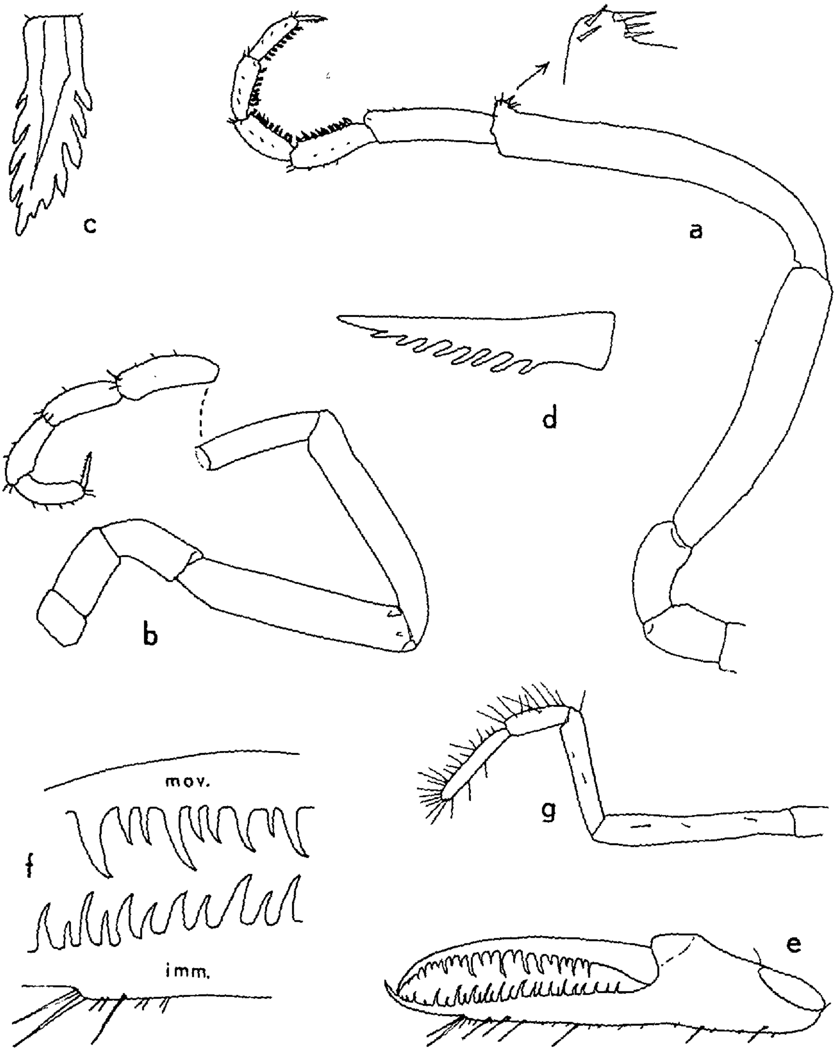

Figure 19. a-d, *Nymphon adami* Giltay, 1937. a, oviger, ♂ (scale 15); b, oviger, ♀ (2); c, compound spine from oviger segment 10, ♀ (11); d, terminal oviger claw, ♀ (10). ♀ from Pillsbury Sta. 248, ♂ from off Sassandra. e-g, *Nymphon caementarum* n. sp., holotype ♂. e, chela (scale 12); f, detail of the dentition of the movable (mov.) and immovable (imm.) fingers (10); g, palp (12). All from Pillsbury Sta. 60.

The female from PILLSBURY Sta. 248 has 26 teeth (long and short, irregularly alternating) on the movable finger, 23 on the immovable one. The compound spine formula, counted in the ♂ from the Ivory Coast, is 9 : 9 : 7 : 8 : : 7.

The number of cement gland pores, on the ventral side of the male femur, is hard to count. In the Nigerian male, I ventured to count about 15 pores on the third leg, but in the Ivory Coast male, some 62 pores were supposed to be present (counted on leg 1). More abundant material will be needed to settle these contradictory data.

The species was known from the West coast of Africa, from Sénégal to the Ivory Coast; the present records add Nigeria to the countries from which the species is known.

Nymphon caementarum n. sp.

Figs. 19e-g, 20

Material.—Ivory Coast: 1 ♂ ovig. (holotype). PILLSBURY Sta. 60: 04° 55'N 05°34.5'W-04°54'N 05°37'W; 79-82 m; 1-VI-1964. (USNM).—Liberia: 1 ♂ (paratype). PILLSBURY Sta. 68: 04°23'N 08°05.5'W-04° 24'N 08°07.5'W; 70 m; 3-VI-1964. (ZMA).

Description.—MALE: Neck moderately long, crop not much widened. Lateral processes very long, diverging, distally separated by more than their own width. Abdomen shorter than 4th lateral process. Eye tubercle cylindrical, truncated at the tip; eyes elongated, pigmented. Insertion of oviger in contact with first lateral process.

Proboscis cylindrical.

Scapes shorter than the proboscis, diverging. Chelae slender, longer than the scape. Palm short; immovable finger 1½ times as long as the palm; immovable finger with 26 teeth, movable one with 22 teeth; a larger tooth alternates with 1 or 2 shorter teeth.

Palp segment 2 the longest; segment 3 longer than 4 or 5; segment 4 shorter than 5.

Oviger slender. Segment 4 almost straight; segment 5 curved in its proximal part, apically with a setiferous lobe. Chaetotaxis formula 8 : 5 : 4 : 6. Terminal claw slender, with 6 inner teeth. The compound spines have 3 lateral denticles on each side.

Legs long. Coxa 2 very elongated. Tibiae subequal; femur shorter than each of the tibiae. A few scattered setae on the longer leg segments. Tarsus shorter than propodus; their ventral margin hardly armed. Claw less than ⅔ as long as the propodus. No auxiliary claws. A most noteworthy feature of the new species is the presence of cement gland pores not only on the ventral side of the femur, but also on coxa 2 and tibia 1. Coxa 2 has 3 gland pores, femur has 6, and tibia 1 has 7 pores. I know of no reference

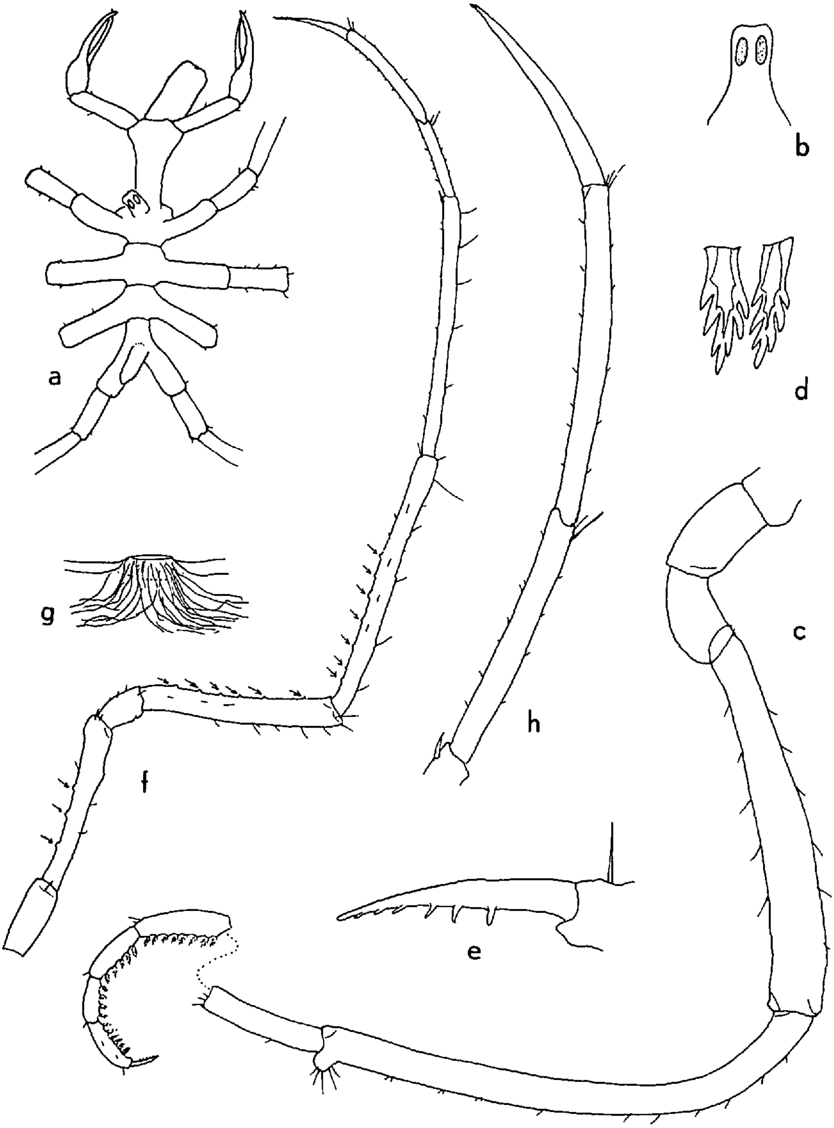

FIGURE 20. *Nymphon caementarum* n. sp., holotype ♂. a, trunk, dorsal (scale 14); b, ocular tubercle, frontal (free-hand sketch); c, oviger (1); d, compound spines from oviger segment 7 (11); e, terminal oviger claw (11); f, third leg (position of the cement gland pores indicated by arrows) (14); g, cement gland opening (free-hand sketch); h, distal segments of 3rd leg (1). All from PILLSBURY Sta. 60.

in the literature of cement gland pores on other segments than the femur (in the present paper tibial cement gland pores have been found also in *Ascorhynchus paramatus* and *A. armatus*).

Remarks.—The present uniunguiculate species can be followed down to couplet 3a, the *albatrossi*-group, in Stock's key (1965). Since 1965, no species have been added to this group. *N. caementarum* differs from the species of the *albatrossi*-group listed by Stock (1965) in the combination of the following characters: ♂ oviger with apophysis on segment 5 and a palm with is much shorter than the fingers (both characters shared by *Nymphon mauritanicum* only). In other features, *N. mauritanicum* is very different, however, from *N. caementarum*, e.g. in the compact, short-necked trunk, the short 2nd coxa, the different relative proportions of the palp segments, the uniform size of the teeth on the fingers of the chelae, etc.

A key to all members of the *albatrossi*-group, also those in which the oviger of the adult ♂ is unknown, is given in the sequel.

The position of the cement gland pores in the present new species seems to be a feature unique for *N. caementarum*. The proposed specific name alludes to this characteristic.

Measurements of the ♂ holotype in mm are: length of trunk (frontal margin neck to tip of 4th lateral process), 3.13; width across 2nd lateral processes, 2.08; greatest diameter of the neck, 0.65; length proboscis (ventral), 0.93; greatest diameter proboscis, 0.35; length scape, 0.75; length chela, 1.08; palp segment 1, 0.11; segment 2, 0.55; segment 3, 0.34; segment 4, 0.18; and segment 5, 0.27.

Measurements of the third leg in mm are: coxa 1, 0.65; coxa 2, 1.50; coxa 3, 0.43; femur, 1.95; tibia 1, 2.63; tibia 2, 2.68; tarsus, 0.93; propodus, 1.25; and claw, 0.83.

Key to the Species of the *albatrossi*-Group in the Genus *Nymphon*

1a. Many more (> 1½ times as many) teeth on the movable than on the immovable finger of the chela 2
b. Not more than 25% more teeth on the movable finger 4
2a. About 80 teeth on the movable finger. .... *N. ohshimai* Hedgpeth, 1949
b. Less than 35 teeth on the movable finger 3
3a. Movable finger with 15, immovable with 9 teeth. Lateral processes short. .... *N. soyae* Utinomi, 1959
b. Movable finger with 30, immovable with 15 teeth. Lateral processes long. .... *N. ochoticum* Losina-Losinsky, 1961
4a. Male oviger with distal lobe on segment 5. Fingers of chela with 20-30 teeth 5

b. These characters not combined 6

5a. Palp segment $2 = 3 = 4 + 5$. Coxa 2 short. ....
.... *N. mauritanicum* Fage, 1942

b. Palp segment $2 \gg 3 \gg 4$; $4 < 5$. Coxa 2 very elongated. ....
.... *N. caementarum* n. sp.

6a. Chela shorter than scape. Fingers with 11-15 teeth 7

b. Chela longer than scape. Fingers with 15-30 teeth. ....
.... *N. albatrossi* Hedgpeth, 1949

7a. Neck long. Lateral processes widely spaced. ....
.... *N. longicollum* Hoek, 1881*

b. Neck short. Lateral processes with rather narrow intervals. ....
.... *N. nipponense* Hedgpeth, 1949

Nymphon surinamense n. sp.

Figs. 21-22

Material.—Surinam: 1 ♂ (holotype). Snellius O.C.P.S. Exped Sta. E 60: 06°05.8'N 56°21.2'W; 19-21 m; 12-V-1966. (RMNH).—2 specimens. O.C.P.S. II, Station unknown, 1969 (this expedition worked on the coast of Surinam, approx. between the mouths of the Surinam River, 55° W, and Marowijne River, 54°W, 0-100 m). (ZMA).—1 ♂, 1 ♀. Snellius O.C.P.S. Sta. L 90: 06°48.0'N 54°11.4'W; 45 m; 12-IV-1969. (RMNH).—French Guiana: 1 ♀ (allotype). Snellius O.C.P.S. Sta. M 89: 06°50.7'N 53°55.2'W; 51 m; 12-IV-1969. (RMNH).

Description.—Male: Body slender, completely segmented. Lateral processes narrow, much longer than wide, separated by intervals that are twice the diameter of each cruriger. Neck slender, narrow in the basal half, strongly widened in the anterior part. Oviger insertion in contact with first lateral process. Abdomen short, elevated at an angle of some 40°. Ocular tubercle low, truncated in front view, rounded in lateral view; eyes well-pigmented.

Proboscis cylindrical, with a slight swelling in the middle.

Chela longer than the scape; fingers much longer than the palm, slightly curved, armed with 19 to 21 teeth of about a size; palm devoid of setae.

Palp thin. Length of the palp segments (in microns) 88, 675, 500, 313, and 313. Several longer setae on segments 4 and 5.

Oviger with an elongated, strongly curved 5th segment. Compound spine formula 9 : 7 : 5 : 6. Terminal claw shorter than segment 10, armed with 6 short teeth. The compound spines are lanceolate, armed with 4 (rarely 3) lateral teeth at either side.

Legs very slender. Coxa 2 elongate; femur remarkably short. About 44

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* This species has, according to Hoek, 1881, vestigial auxiliary claws, but according to Gordon, 1932a, no auxiliary claws.

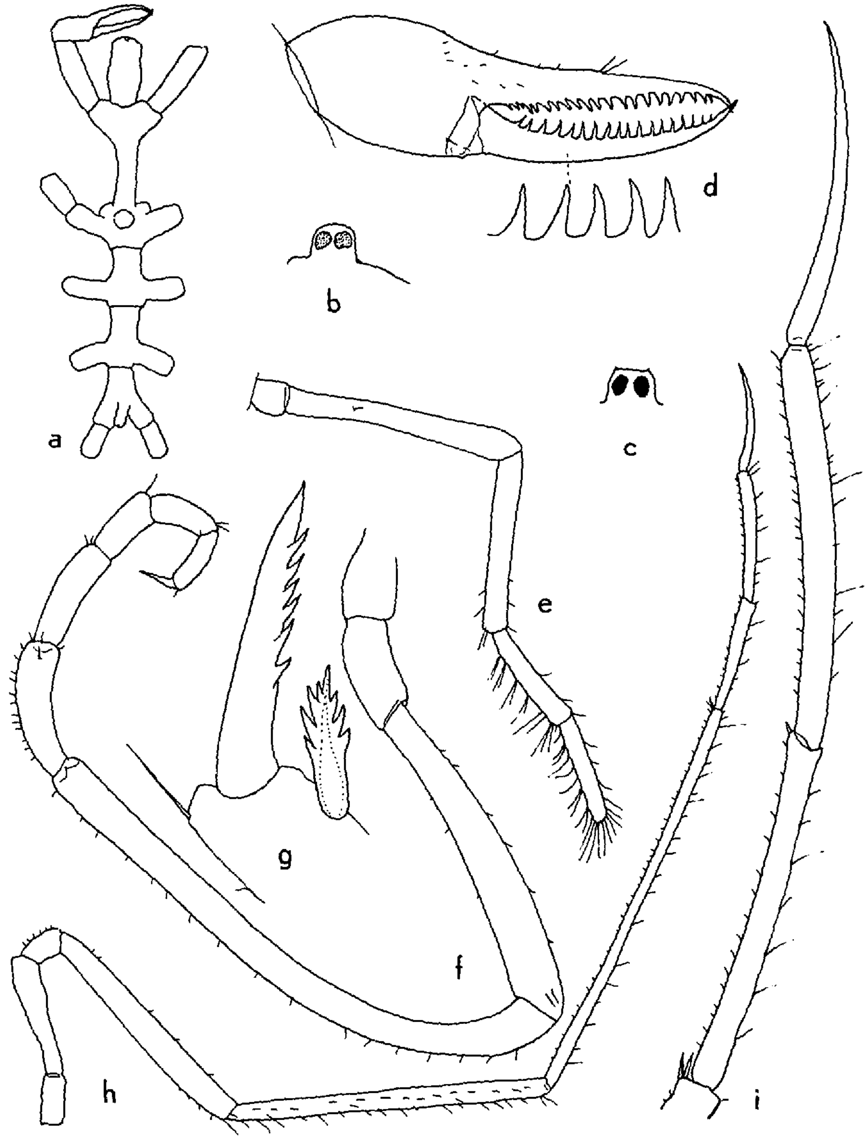

FIGURE 21. *Nymphon surinamense* n. sp., holotype ♂. a, trunk, dorsal (scale 3); b, ocular tubercle, from the right (free-hand sketch); c, ocular tubercle, frontal (free-hand sketch); d, chela (12); e, palp (12); f, oviger (1); g, distal portion of oviger (11); h, second leg (3); i, distal segments of 2nd leg (3). All from SNELLIUS O.C.P.S. Sta. E 60.

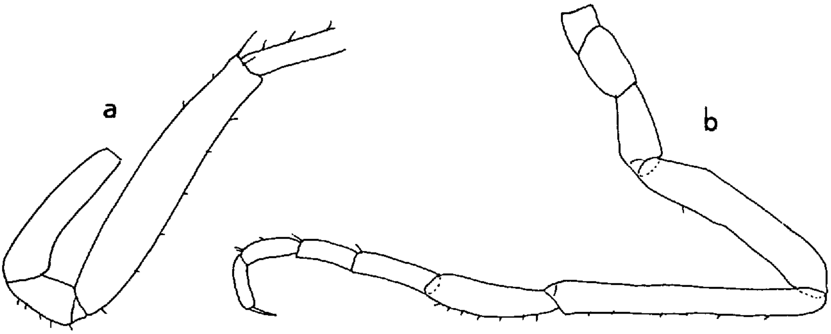

FIGURE 22. *Nymphon surinamense* n. sp., allotype ♀. a, femur (scale 2); b, oviger (19). From SNELLIUS O.C.P.S. Sta. M 89.

cement gland pores have been counted on the femur of leg 2. Tibia 2 the longer segment. Both tibiae provided with scattered setae, which are shorter than, or as long as, the diameter of the segment. Tarsus shorter than the propodus; claw slender, subequal to the tarsus. Ventral margin of tarsus and propodus evenly armed with a row of short spinules.

FEMALE: Oviger segment 5 less elongated; oviger spine formula 10 : 7 : 7 : 6 : : 5. Femur slightly swollen. For the rest similar to the male.

Measurements of the holotype in mm are: length trunk (frontal margin neck to tip 4th lateral process), 3.37; length trunk segment 1, 1.48; width across 2nd lateral processes, 1.33; length proboscis (dorsal), 0.77; greatest diameter proboscis, 0.33; length scape, 0.83; and length chela, 1.35.

Measurements of the second leg in mm are: coxa 1, 0.50; coxa 2, 1.17; coxa 3, 0.37; femur, 2.47; tibia 1, 3.50; tibia 2, 4.17; tarsus, 1.17; propodus, 1.33; and claw, 1.13.

Remarks.—This is the first uniunguiculate *Nymphon* that becomes known from the Neotropics. It belongs to a group of species that has its distribution center along the west and south coasts of Africa. This group (couplet 6b of my 1965 key) can be called the *phasmatodes*-group, after the oldest described species in it. In my 1965 paper, I listed 6 species belonging to the *phasmatodes*-group. Since then, one other species has been described (*Nymphon nugax* Stock, 1967), whereas *Nymphon chaetochir* Utinomi, 1971, might also belong to this species group.

Nymphon surinamense differs from the other members of the *phasmatodes*-group as follows: (1) *affine*, *comes*, and *cognatum* have a short claw on the legs and about 20 teeth on the oviger claw; (2) *phasmatodes* (= *capense*) has a quite different ♂ oviger, and has 60-65 teeth on the fingers of the chela; (3) *crosnieri* has a less slender trunk and teeth of alternating sizes on the fingers of the chela; (4) *tenuipes* has very setose legs and only 6 to 7 cement gland pores; (5) *chaetochir* has hairy chelae with long teeth on the fingers; (6) *nugax* (no doubt the most closely related to the new species) has more teeth (26-33) on the fingers of the chelae, the tarsus and propodus are devoid of ventral armature, the shape of the compound oviger spines is different, and the 5th oviger segment (♂) bears a distal apophysis.

Family Callipallenidae

Callipallene brevirostrum (Johnston, 1837)

Callipallene brevirostris brevirostris.—Stock, 1952: 5-6 (refs.).

Material.—Florida: 2 ♀. Hummelinck Sta. 1410: Key Biscayne, North Point; *Thalassia*; 1-IX-1963. (ZMA).—1 ♀. Hummelinck Sta. 1412: Key Biscayne, N.W. swamp; mangrove ditch; 31-VIII-1963. (ZMA).—Puerto Rico: 1 ♂. San Christobal Reef (W. of La Parguera); abt. 3 m; in stomach of fish, *Halichoeres bivittatus*; M. J. Roede coll.; 10-II-1963. (ZMA).—2 ♂, 3 ♀. Morrillos; on *Sargassum* sp.; less than 5 ft.; 29-II-1968; V. A. Capriles coll. (ZMA).—2 ♂, 2 ♀. Tamarinck, Guanica; on *Sargassum* sp.; less than 2 ft.; 31-X-1968; V. A. Capriles coll. (ZMA).—St. Croix: 1 ♂ ovig., 1 ♂. Hummelinck Sta. 1404: Krausse Lagoon; seaside; *Halimeda*; 15-VI-1955. (ZMA).—St. Kitts: 1 ♀. Hummelinck Sta. 1397: Frigate Bay, S.E.; 20-VII-1955. (ZMA).—Antigua: 1 young ♀. Hummelinck Sta. 1393: Deep Bay at Fort Barrington; 17-VII-1955. (ZMA).—Bonaire: 4 ♂ ovig., 1 ♂, 4 ♀. Hummelinck Sta. 1064c: Lac, Poejito; *Rhizophora;* 17-IV-1955. (ZMA).—1 ♂, 1 ♀. Hummelinck Sta. 1573: Central Lac, 1 km N.W. of Cai; 1.5 m; muddy sand; *Halimeda, Thalassia*; 25-VIII-1967. (ZMA).—2 ♂ ovig., 1 ♂, 1 juv. Hummelinck Sta. 1575 Aa: Lac, Puito; entrance; 0.25-0.50 m; mud; *Thalassia*; 11-III-1970. (ZMA).—1 juv. Hummelinck Sta. 1576: Lac, Cai, E. side; 0-0.5 m; mud; *Rhizophora*; 16-IX-1967. (ZMA); moreover 1 ♂, 1 ♀, 1 juv. from Sta. 1576A, same loc. (ZMA).—5 ♂ (partly ovig.), 6 ♀. Hummelinck Sta. 1587: Lac, Boca Fogon; entrance; 0-0.5 m; sandy mud; *Rizophora, Acetabularia*; 24-VIII-1967. (ZMA); moreover 3 ♂ 4 ♀ from Sta. 1587A, same loc. (ZMA).—French Guiana: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 5: 06°36′N 53°33′W; 44 m; calcareous sand; 24-VIII-1970. (RMNH).—Guyana: 2 ♂, 3 ♀, 2 juv. LUYMUS Guyana Shelf Exped. Sta. 76: 06°41′N 57°18′W; 23 m; sandy mud; 1-IX-1970. (RMNH).—20 ♂ (partly ovig.), 18 ♀, 13 juv. LUYMUS Guyana Shelf Exped. Sta. 112: 07° 24′N 57°36′W; 39 m; muddy sand; 5-IX-1970. (RMNH).

Remarks.—Previous Caribbean records: see Stock, 1954a, and Bourdillon, 1955: 589.

The identification of *Callipallene* material still is a matter of considerable difficulty. My original idea (Stock, 1952) that bathymetrically separated subspecies exist in European material, is almost certainly not true. The trinomina attributed to *Callipallene* species represent partially no subspecies in the classical sense, but are indications of species-groups (superspecies). I agree with Krapp, 1973, that the entire genus awaits a new revision.

Probably all the Caribbean material recorded here belongs to the typical form of *C. brevirostrum*, the so-called "*C. brevirostris brevirostris*". No specimens with a very tall ocular tubercle ("*C. brevirostris longicoxa*") have been encountered. Perhaps the only difference between Caribbean *C. brevirostrum* and European material is the more clearly indicated intersegmental line between trunk segments 3 and 4 in the former.

Callipallene emaciata (Dohrn, 1881)

Callipallene emaciata emaciata.—Stock, 1952: 8 (refs.).

Material.—Florida: 1 ♀. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—Barbuda: 1 ♀. Hummelinck Sta. 1394: Martello Tower Beach; 8-VII-1955. (ZMA).—Antigua: 1 ♂. Hummelinck Sta. 1393: Deep Bay at Fort Barrington; 17-VII-1955. (ZMA).—Venezuela: 1 ♂ ovig., 1 ♀, 1 juv. Hummelinck Sta. 1215: Los Frailes, La Pecha; rock debris; sand; 1-2 m; 19-VI-1936. (ZMA).—Guyana: 2 specimens. LUYMUS Guyana Shelf Exped. Sta. 74: 06°46'N 57°16'W; 27.5 m; muddy sand; 31-VIII-1970. (RMNH).—1 ♀ LUYMUS Guyana Shelf Exped. Sta. 94: 06°56'N 57°30'W; 26 m; mixed hard bottom; 2-IX-1970. (RMNH).

Remarks.—These finds confirm Hedgpeth's (1948) records of *C. emaciata* in Florida. In my 1952 paper I doubted these identifications, but as is evident now, unjustly. The present material belongs to the typical form of *C. emaciata*, to which the trinomen *C. emaciata emaciata* has been applied.

Callipallene sp.

Material.—Florida: 1 juv. Hummelinck Sta. 1414: E. of Elliot Key, 2-6 m; 5-IX-1963. (ZMA).—Puerto Rico: 1 ♀, 1 juv. Hummelinck Sta. 1423A: Bahía Fosforescente; 1 m; sandy; *Thalassia, Halimeda*; 17-IX-1963. (ZMA).—French Guiana: 1 juv. LUYMUS Guyana Shelf Exped. Sta. 1: 07°10'N 53°55'W; 130-104 m; sandy calcarenite; from Gorgonaria; 24-VIII-1970. (RMNH).

Remarks.—The female from Hummelinck Sta. 1423A is in fragmentary condition. It might quite well represent *C. longicoxa* Stock, 1955b.

The juvenile from LUYMUS Guyana Shelf Exped. Sta. 1 has too long a neck for *C. brevirostrum*. It may represent *C. producta*.

Pallenoides spinulosa Stock, 1955.

Pallenoides spinulosa Stock, 1955b: 227-230, figs. 6-7; Capriles, 1970: 105.

Material.—Puerto Rico: 2 ♂. Joyuda; on *Sargassum* attached to the pilings of a boat house; 28-I-1967; V. A. Capriles coll. (ZMA).

Remark.—This material was already mentioned in Capriles' paper (1970).

Pallenoides amazonica n. sp.

Figs. 23-24

Material.—Brazil: 1 ♀ (holotype). SALDANHA Sta. 1804B: 00°09′S 46°55.5′W; 24 m; 25-XI-1967. (ZMA).—1 ♂ (allotype). SALDANHA Sta. 1765A: 00°31.0′N 47°49.0′W; 39 m; 12-XI-1967. (ZMA).—1 ♂ ovig., 1 ♂, 1 ♀ (paratypes). SALDANHA Sta. 1762A: 00°13.0′N 46°40.0′W; 36 m; 8-XI-1967. (ZMA).—1 ♂ juv. SALDANHA Sta. 1814: 01°45.5′S 43° 21.7′W; 53 m; 28-XI-1967. (ZMA).—1 ♂ ovig., 1 ♂ (paratypes). SALDANHA Sta. 1753A: 00°38.0′S 45°58.0′W; 32 m; 7-XI-1967. (ZMA).—1 ♂ ovig. (paratype). CANOPUS Sta. 27: 02°15′S 38°15′W; 72 m; 11-VIII-1965. (ZMA).

Description.—FEMALE (holotype). Body completely segmented. Neck short, wide, and heavy, laterally provided with a spiniferous tubercle. Lateral processes distally armed with low spiniferous tubercles, 1 to 3 on each lateral process. The intervals between the lateral processes are narrow. Mid-dorsal line unadorned. Abdomen short, distally truncated, erect.

Proboscis cylindrical in its basal part, widened in the distal part, rounded distally.

Ocular tubercle low, with two minute lateral points, distally roundedly truncate. Eyes well-pigmented.

Chelifore scape short, armed with some spinules. Chela heavy, with short fingers. Immovable finger vaguely crenulated along its inner margin, movable finger almost smooth.

No palps.

Oviger segment 5 the longest. Segments 7 to 10 with ovate compound spines of the *Callipallene*-type; basal and lateral teeth only slightly larger than the remaining teeth. Compound spine formula 9 : 8 : 7 : 9. Distal end of segment 10 provided with a short seta.

Legs with low spiniferous tubercles on the proximal six segments. Propodus strongly curved, with 5 basal spines on the heel; propodal sole with some 12 spinules. Claw strong, auxiliary claws about ⅓ of the main claw. Sexual pores distinct, on coxa 2 of all legs.

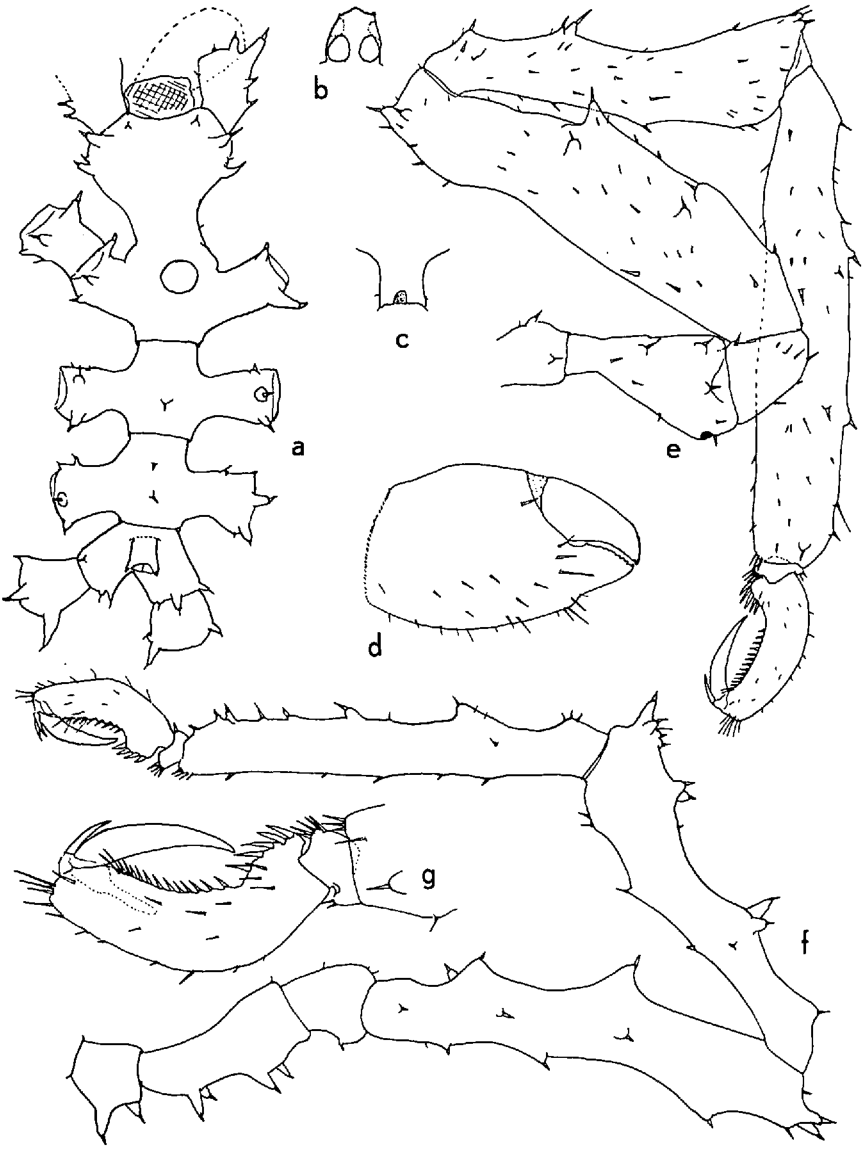

FIGURE 23. *Pallenoides amazonica* n. sp. a, trunk, ♂, dorsal (scale 5); b, ocular tubercle, ♀, frontal (free-hand sketch); c, abdomen, ♀, anterodorsal (free-hand sketch); d, chela, ♀ (12); e, second leg, ♀ (5); f, third leg, ♂ (5); g, distal segments of 2nd leg, ♀ (12). ♂ from CANOPUS Sta. 27, ♀ from SALDANHA Sta. 1804B.

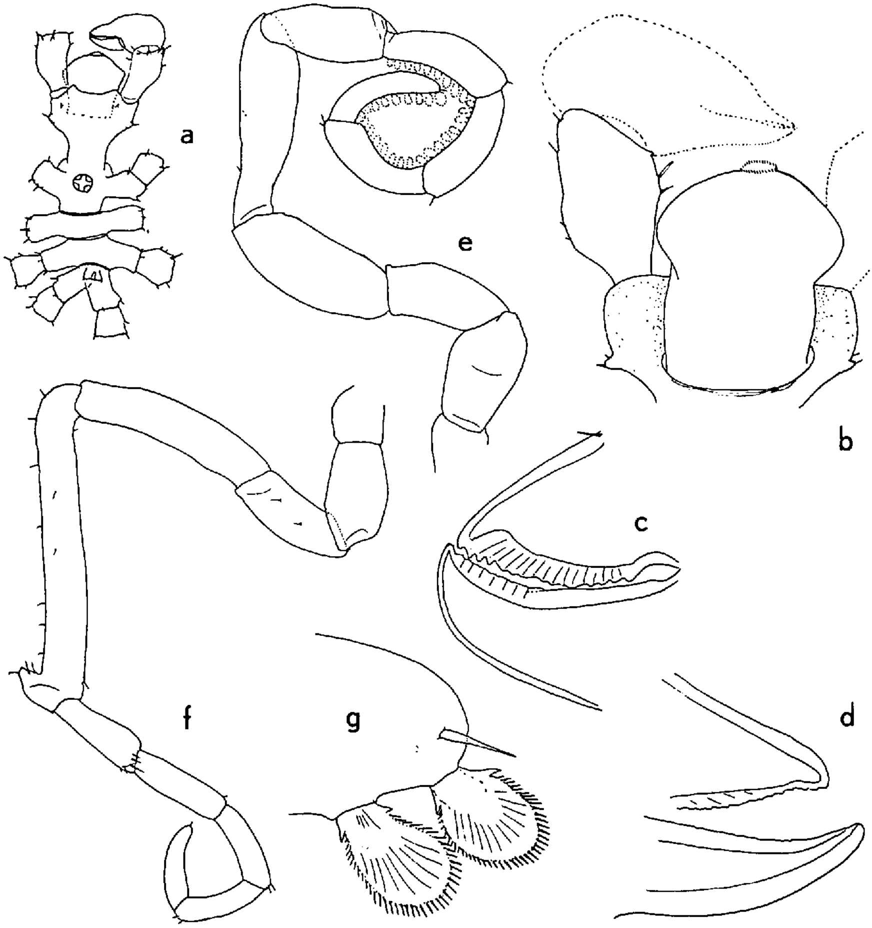

FIGURE 24. *Pallenoides amazonica* n. sp. a, trunk, ♀, dorsal (scale 16); b, proboscis, ventral, ♀ (1); c, tip chela, ♀ (10); d, tip chela, ♂ (10); e, oviger, ♀ (12); f, oviger, ♂ (12); g, distal end of oviger, ♀ (8). a, b, c, e, and g from SALDANHA Sta. 1804B; d from SALDANHA Sta. 1762A; f from SALDANHA Sta. 1765A.

MALE (allotype): Neck and lateral processes with more pronounced tuberculation and spinulation. Legs also more distinctly spiny. Oviger segment 5 elongated, distally provided with a strong lobe. Compound spine formula 10 : 7 : 6 : 9. Terminal armature of oviger as in female.

Remarks.—The new species resembles superficially *Pallenoides spinulosa* Stock, 1955, from the West Indies, but differs at closer inspection from all other *Pallenoides* species, except *P. stylirostrum* Stock, 1973, in the presence of auxiliary claws. *P. stylirostrum* can be recognized at once from the present species by the shape of the proboscis, and by the shorter, almost rudimentary, auxiliary claws. A key to all known species of *Pallenoides* is provided in the sequel.

Derivatio nominis.—The proposed specific name alludes to the position of the type-locality near the mouths of the Amazon River. The other records are all from a restricted stretch along the north coast of Brazil, between the Amazon and Fortaleza.

KEY TO THE SPECIES OF THE GENUS *Pallenoides*

1a. Auxiliary claws absent .... 2.
b. Auxiliary claws present, though small .... 5.
2a. Legs with strong, spiniferous processes or tubercles .... 3.
b. Legs spiniferous, but without processes or tubercles .... 4.
3a. Basal lateral denticle of oviger spines very much larger than the others. Fingers of chela smooth. .... *P. opuntia* Stock, 1965.
b. Basal lateral denticle of the same (small) size as the other denticles. Fingers of chela crenulated. .... *P. spinulosa* Stock, 1955b.
4a. Chelifore scape, cephalic segment, and lateral processes with tubercles. .... *P. proboscidea* Barnard, 1955.
b. Chelifore scape, cephalic segment, and lateral processes without tubercles. .... *P. magnicollis* Stock, 1951.
5a. Proboscis styliform. .... *P. stylirostrum* Stock, 1973.
b. Proboscis "normal". .... *P. amazonica* n. sp.

Measurements of the holotype (♀) of *Pallenopsis amazonica* in mm are: length trunk (tip proboscis to tip 4th lateral process), 2.63; width across 2nd lateral processes, 1.08; greatest diameter neck, 0.81; length scape, 0.54; length chela, 0.83; length proboscis (ventral), 0.76; and greatest diameter proboscis, 0.58.

Measurements of the second leg in mm are: coxa 1, 0.36; coxa 2, 0.83; coxa 3, 0.36; femur, 2.16; tibia 1, 1.76; tibia 2, 2.34; tarsus, 0.11; propodus, 0.72; claw, 0.43; and auxiliary claws 0.14.

Pigrogromitus timsanus Calman, 1927

Pigrogromitus timsanus Calman, 1927: 408-410, fig. 104 a-f; Hedgpeth, 1948: 214-216, fig. 23; Stock, 1968: 46; Lipkin & Safriel, 1971: 9; Arnaud, 1972: 159-160.

Clotenopsa prima Hilton, 1942: 52-53, fig. 8.

Material.—Florida: 1 specimen. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).—2 specimens. Hummelinck Sta. 1410A: Key Biscayne, North Point; *Rhizophora;* 1-IX-1963. (ZMA).—Curaçao: 8 specimens. Hummelinck Sta. 1620: Piscadera Bay, outer bay; piling (iron and wooden poles); 0-1 m; 14-X-1967. (ZMA).

Remark.—A circum-tropical species.

Family Phoxichilidiidae

(incl. *Pallenopsis* and Endeidae)

Since *Philyra* (see discussion under *Anoplodactylus antillianus* n.sp.) and *Pallenopsis spicata* link the genus *Pallenopsis* with the Phoxichilidiidae, I have removed this genus from the Callipallenidae again.

Endeis is a member of the Phoxichilidiidae in all respects, except in the reduction of the chelifores in adults. In juveniles the chelifores are shaped as in *Anoplodactylus.* Sometimes, adult specimens of *Endeis* retain the (neotenic) chelifores; such specimens are almost identical with members of the *Anoplodactylus-Phoxichilidium*-complex.

Genus *Pallenopsis* Wilson, 1881

Between 60 and 70 taxa are actually considered valid in this genus. Part of these taxa have the fingers of the chelae shorter than the palm, broad, wedge-shaped, meeting when closed, and often oriented at a distinct angle on the palm. The scape consists of two more or less fused segments (articulation not functional). At the base of the movable finger, a "spiny cushion" is present. Auxiliary claws are usually present, often long. This group contains mostly shallow-water species. To this group of species belong the type-species of the genus (by subsequent selection, Helfer & Schlottke, 1935), *P. fluminensis* (Krøyer, 1844), as well as the type of the subgenus *Rigona* Loman, 1908 (by subsequent selection, Helfer & Schlottke, 1935), *P.* (*R.*) *rigens* Loman, 1908, and the type of the subgenus *Pallenopsodon* Stock, 1956 (by original designation), *P.* (*P.*) *brevidigitata* Möbius, 1902.

The discovery of a new species, described in the sequel, made me doubt the validity of the subgenus *Pallenopsodon.* This subgenus is characterized by the presence, on oviger segment 10, of a longitudinal row of regularly placed spines (versus scattered elements in *Pallenopsis* s. str.), and by a femoral cement gland opening through a simple pore (a tube in *Pallenopsis* s. str.). In the new species dredged by the PILLSBURY (*P. comosa* n.sp.), the 10th oviger segment is of the *Pallenopsodon*-type in the female, of the

Pallenopsis-type in the male; the cement gland is of the *Pallenopsis*-type. This upsets the value of the subgeneric distinction.

In the remaining species, the fingers of the chelae are equal to, or longer than, the palm, slender, curved, gaping when closed and oriented more or less in prolongation of the palm. In this group of species, the scape usually consists of two, well-articulated segments. A spiny cushion at the base of the movable finger is absent. Auxiliary claws are absent or small (less than ⅓ of the main claw). This group consists of deep-water species (some bathypelagic).

Since the great number of species in *Pallenopsis* makes an attempt towards subdivision desirable, I have endeavored to create a new subgenus for this group, which is called *Bathypallenopsis* n. subgen.

Subgenus *Pallenopsis* s. str.

Diagnosis.—Fingers shorter than the palm; broad, wedge-shaped; meeting when closed; often oriented at a distinct angle on the palm. Scape consisting of two more or less fused segments (articulation non-functional). A spiny cushion present at the base of the movable finger. Auxiliary claws usually present, often long.

Type–species: *P.* (*P.*) *fluminensis* (Krøyer, 1844).

This is a predominantly tropical and subtropical subgenus, most often restricted to shallower waters. The richest center of speciation for this subgenus appears to be the Atlantic coasts of South America, where not less than 11 species have been found. Since the differences between these various species are often slight, a key may be of some use:

KEY TO THE SPECIES OF THE SUBGENUS *Pallenopsis* S. STR. KNOWN FROM THE ATLANTIC COASTS OF SOUTH AMERICA.

1a. Auxiliary claws less than ¼ of the main claw. Cement gland duct very short, about as long as wide. .... *P. forcifer* Wilson, 1881 (Trinidad to Cape Hatteras).
b. Auxiliary claws at least ⅓ of the main claw. Cement gland duct longer .... 2.
2a. Propodus slender (about 4 × as long as wide) .... 3.
b. Propodus more heavy, robust (2½-3½ × as long as wide) .... 5.
3a. Oviger adult ♀ 8-segmented. Tibia 2 about as long as femur. (Auxiliary claws ⅓ to ⅖ as long as the main claw). .... *P. kempfi* n. sp. (the Guyanas and adjacent Brazil).
b. Oviger adult ♀ 10-segmented (when 9-segmented, the auxiliaries are at least ½ as long as the main claw). Tibia 2 15-55% longer than the femur .... 4.

4a. Oviger segment 2 (♂, ♀) about as long as segment 4. Auxiliary claws more than ⅓ of the main claw. .... *P. meinerti* Schimkewitsch, 1930. (Brazil).
b. Oviger segment 2 (♂, ♀) much shorter than segment 4. Auxiliary claws about ⅓ of the main claw. .... *P. tumidula* Loman, 1923. (Mouth of La Plata, Argentina).
c. Oviger segment 2 (only known sex ♀) much shorter than segment 4. Auxiliary claws slightly more than half as long as the main claw. .... *P. boehmi* Schimkewitsch, 1930. (Patagonian coast, Magellan Strait).
5a. Auxiliary claws distinctly less than half as long as the main claw. .... *P. patagonica* (Hoek, 1881). (S. of 37°S).
b. Auxiliary claws more than half as long as the main claw .... 6.
6a. Females (sexual pores on all legs, no cement gland duct, oviger 8- or 9-segmented) .... 7.
b. Males (sexual pores on legs 3 and 4, cement gland duct on femur present, oviger 10-segmented) .... 9.
7a. Oviger segment 6 slender, as long as 5. Terminal oviger segment subequal to penultimate segment. (Legs with very short setules only). .... *P. fluminensis* (Krøyer, 1844). (Southern and central Brazil).
b. Oviger segment 6 shorter than segment 5. Terminal oviger segment at most half as long as the penultimate segment .... 8.
8a. Very long setae, especially on tibia 1. .... *P. schmitti* Hedgpeth, 1943. (Florida, Caribbean, to northern Brazil).
b. Setae on tibia 1 not very long. .... *P. candidoi* de Mello-Leitão, 1949. (Brazil, Guyanas).
9a. Cement gland duct about as long as the femoral diameter .... 10.
b. Cement gland duct much shorter than the femoral diameter .... 11.
10a. Lateral processes separated by less than their own diameter. .... *P. logicoxa* Stock, 1966. (Southern Brazil).
b. Lateral processes separated by much more than their own diameter. .... *P. schmitti* Hedgpeth, 1943. (Florida, Caribbean, to northern Brazil).
11a. Tibia 1 with short setules only. .... *P. fluminensis* (Krøyer, 1844). (Southern and central Brazil).
b. Tibia 1 with several longer setae .... 12.
12a. Coxa 2 about twice as long as wide. .... *P. hoekiana* Schimkewitsch, 1930. (Bahia, Brazil).
b. Coxa 2 much more than twice as long as wide. .... *P. candidoi* de Mello-Leitão, 1949. (Brazil, Guyanas).

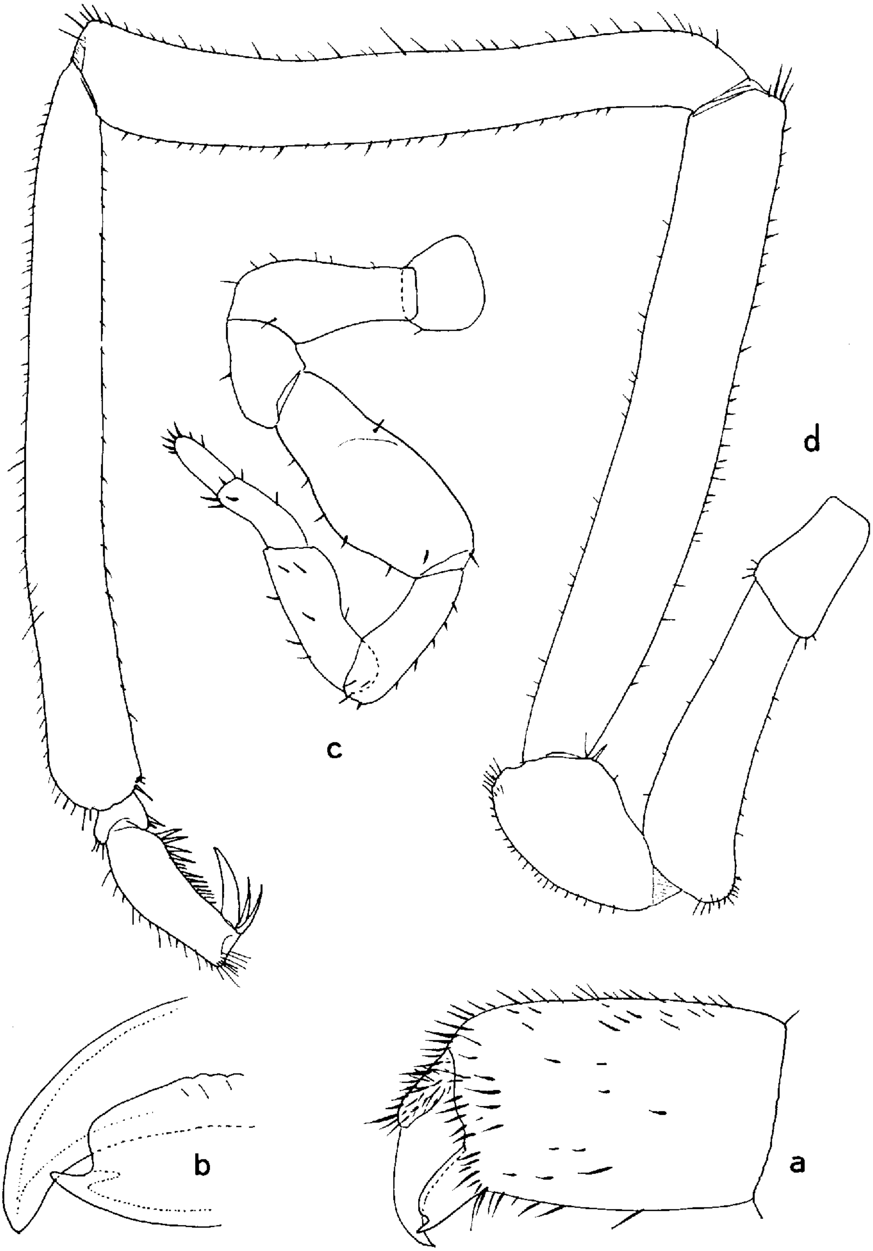

FIGURE 25. *Pallenopsis* (*Pallenopsis*) *fluminensis* (Krøyer, 1844), ♀. a, chela (scale 1); b, tip of fingers (6); c, oviger (1); d, first leg. From RECIFE Sta. 78.

Pallenopsis (Pallenopsis) fluminensis (Krøyer, 1844)
Fig. 25

Phoxichilidium fluminensis Krøyer, 1844: 104, 124, pl. I figs. 1 a-f.

Pallenopsis fluminensis Meinert, 1898: 49, pl. V figs. 1-6; Meinert 1899: 52, pl. V figs. 1-6; Helfer & Schlottke, 1935: 265, fig. 174; Marcus, 1940a: 182, figs. 1-6; Marcus, 1940b: 24, figs. 1 A-B.

Non *Pallenopsis fluminensis* auct. div.

Material.—Brazil: 1 ♀. RECIFE Sta. 78: 08°07.8'S 34°52.7'W; 6.0 m. (ZMA).

Remarks.—This species has been the subject of great confusion. The material recorded under the name of *fluminensis* by Schimkewitsch (1887, 1890), Böhm (1879), and Hoek (1881) is currently considered to be different. Moreover, a number of closely related species have been described in the 20th century (*tumidula* Loman, 1923; *longicoxa* Stock, 1966; *schmitti* Hedgpeth, 1943; and *candidoi* de Mello-Leitão, 1949). Moreover, *P. patagonica* (Hoek, 1881), and its possible synonyms (cf. Gordon, 1944), show affinities to the *fluminensis*-group.

I have seen material of several of these species, and consider them provisionally as good species. The major problem is, that the species of the genus *Pallenopsis* exhibit great variability, at least in the nature of the setation of the legs. The preceding key is constructed, therefore, chiefly on the relative length of the propodus, the auxiliary claws, the cement gland duct, and the oviger segments. Since, however, most of the species are known in small numbers only, it is uncertain whether these features are subject to variation or not.

The present female specimen from RECIFE Sta. 78 (= off Recife, Brazil) corresponds with Marcus' (1940a, 1940b) description of *P. fluminensis* in a number of, I presume, important characters. So, the ♀ oviger is 8-segmented, segments 5 and 6 are subequal, and segment 8 is not much shorter than segment 7. Moreover, this is the only South American *Pallenopsis* without a dense cover of setae on tibia 1. It has, like the type of *P. fluminensis*, a short and compactly built propodus, whereas the palm of the chela is only 1½ times as long as wide.

Not in agreement with Marcus' description are the relative lengths of the segments of the legs. In Marcus' material, coxa 2 is only twice as long as wide, in the present specimen distinctly more. Marcus' measurements show that the femur is usually the longest leg segment, or else the first tibia (in the other South American *Pallenopsis*-species, the first tibia usually is the shortest segment, and femur and tibia 2 are either subequal, or tibia 2 is the longest). In the present material femur, tibia 1, and tibia 2 are about equal in length.

A number of essential structural details of the Recife specimen have been illustrated. With some reservation I have attributed this specimen to *P. fluminensis*. Like Marcus' records (at low tide), the present material originates from very shallow waters (6 metres).

Pallenopsis (Pallenopsis) hoekiana Schimkewitsch, 1930

Phoxichilidium fluminense Hoek, 1881: 81-82, pl. XIV figs. 1-4 (non Krøyer, 1844).

Pallenopsis hoekiana Schimkewitsch, 1930: 237; Marcus, 1940a: 187-188; Marcus, 1940b: 22, 24, 28.

non *Pallenopsis hoekiana*.—Hedgpeth, 1943: 44 (= *P. tumidula* Loman, 1923).

Remarks.—This is a ghosty species. The name *hoekiana* was given by Schimkewitsch to the single male taken off Bahia, Brazil, by the CHALLENGER, merely on the basis of the rather generalized description of this specimen by Hoek, 1881. There is no indication that the actual specimen was re-examined by Schimkewitsch. Marcus' discussions are based entirely upon Hoek's and Schimkewitsch' papers.

The only other record of *P. hoekiana*, based on new material, is that of Hedgpeth, 1943, who mentions—without descriptive notes— a male from ALBATROSS Sta. 2769 (45°22'S 64°20'W, 51.5 fms). Thanks to the kind assistance of Dr. C. A. Child, of the Smithsonian Institution, Washington, D.C., I could re-examine this specimen. It proved to be an ovigerous male of *Pallenopsis tumidula* Loman, 1923 (see redescription of the types of *tumidula* in Stock, 1957). The occurrence of this species at some 45° southern latitude is consistent with the known distribution of *P. tumidula*, and does not fit very well in the picture of a tropical shallow-water species, as is *P. hoekiana*.

In view of the inadequate morphological data known about *P. hoekiana*, and in absence of any other records, I tried to locate the CHALLENGER specimen upon which the species was based. Unfortunately, Dr. Roger J. Lincoln, of the British Museum (Natural History) informed me (in litt., 25 Apr. 1973) that the specimen could not be located amongst the CHALLENGER materials.

This leaves us where we started: with an incomplete description, which might be (as Marcus, 1940b: 28 supposed) based on an aberrant or accidentally damaged specimen. Pending the discovery of new material, I keep *hoekiana* apart from *P. fluminensis*, but like Marcus, I have the feeling that the two might be identical.

Pallenopsis (Pallenopsis) meinerti Schimkewitsch, 1930
Figs. 26-27

Pallenopsis meinerti Schimkewitsch, 1930: 237; Marcus, 1940a: 188; Marcus, 1940b: 22.

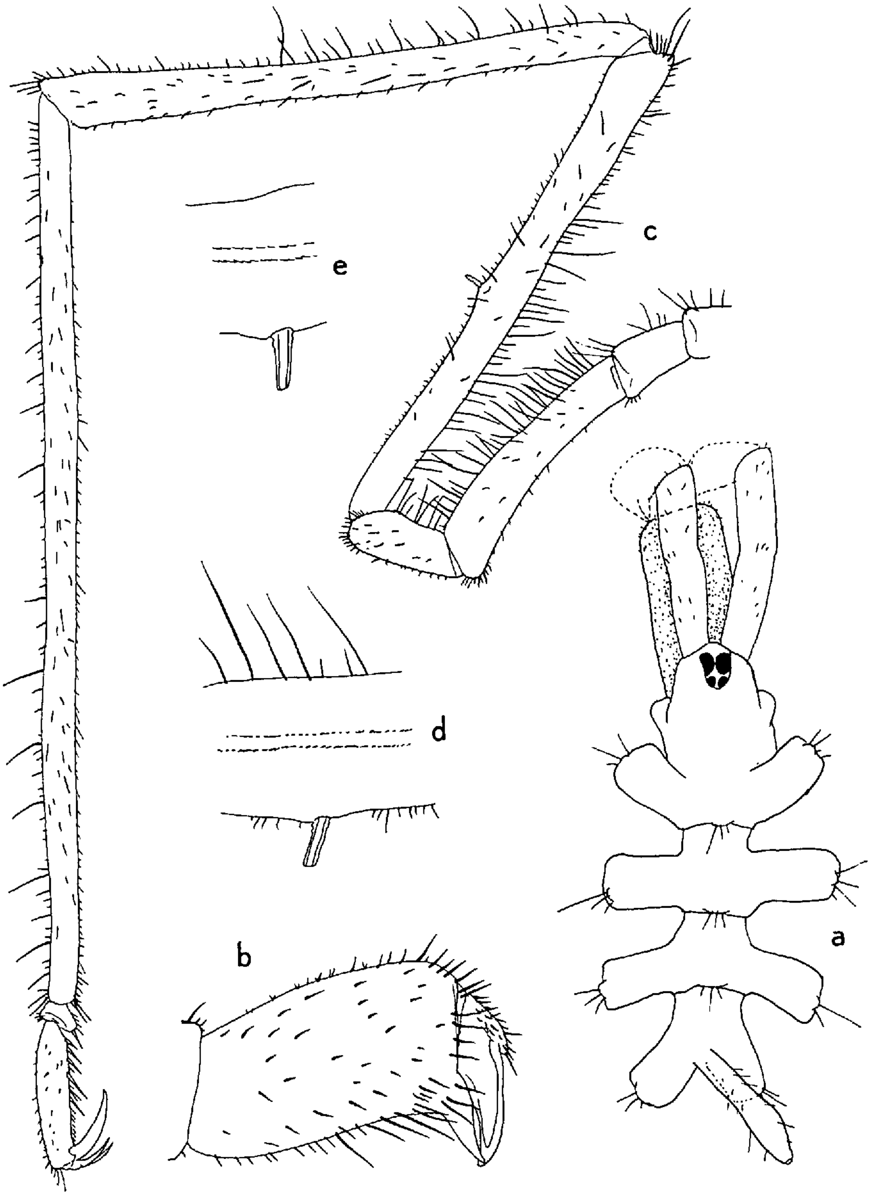

FIGURE 26. *Pallenopsis* (*Pallenopsis*) *meinerti* Schimkewitsch, 1930. a, trunk, ♀, dorsal (scale 16); b, chela, ♂ (1); c, first leg, ♂ (3); d, cement gland duct on leg 1, ♂ (1); e, same on leg 3, ♂ (1). All from AKAROA Sta. 05C.

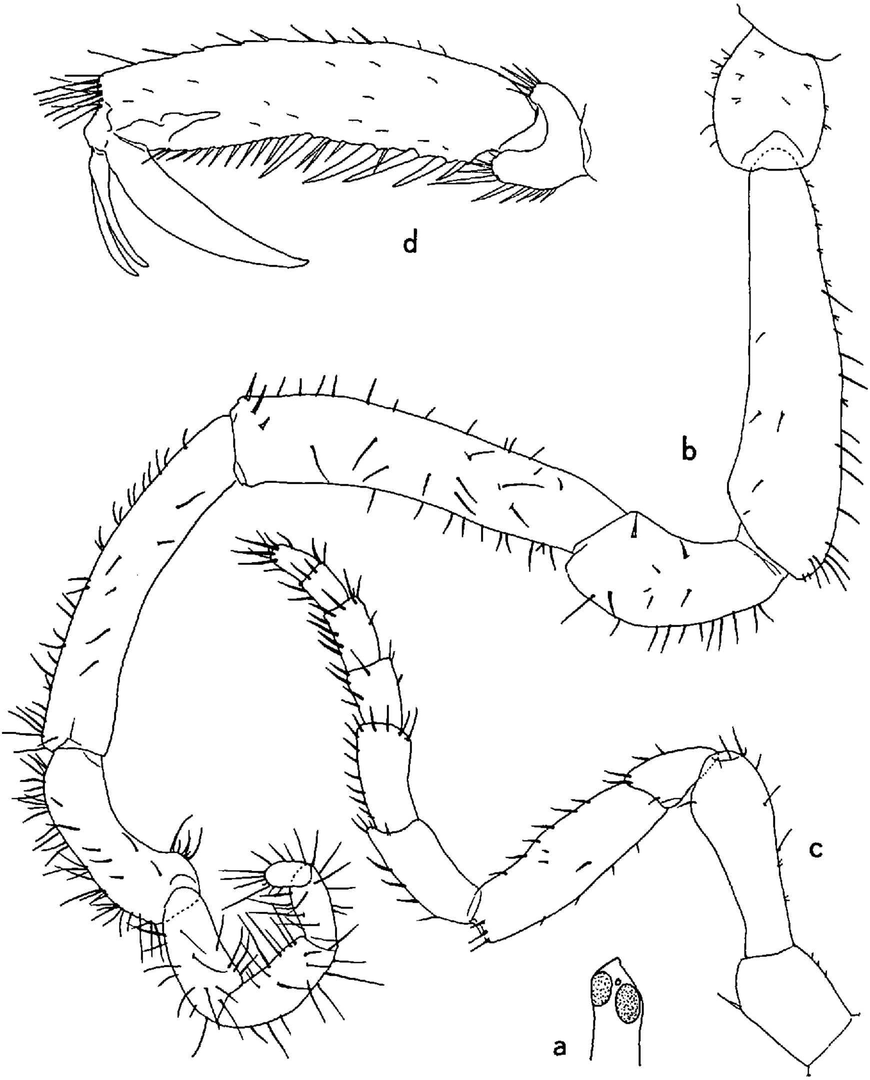

FIGURE 27. *Pallenopsis* (*Pallenopsis*) *meinerti* Schimkewitsch, 1930. a, ocular tubercle, ♂, from the right (free-hand sketch); b, oviger, ♂ (1); c, oviger, ♀ (1); d, distal segments of first leg, ♂ (1). From AKAROA Sta. 05C.

Pallenopsis fluminensis (non Krøyer, 1844).—Schimkewitsch, 1887: 271; Schimkewitsch, 1890: 339-342, pl. figs. 24-31.

Material.—Brazil: 1 ♂ ovig., 1 ♀. AKAROA Sta. 05 C: 09°01'00"S 34° 51'10"W; 370 m; 10-IX-1965. (ZMA).

Remarks.—I ventured to identify the present specimens with *P. meinerti*, not collected again after the original find of two specimens by Schimkewitsch (1887, 1890) in the material of the VETTOR PISANI. The origin of the VETTOR PISANI material is dubious, since Schimkewitsch (1890: 329) records an immature female from the Strait of Magellan, and a male from the Abrolhos Islands, but on page 340 of the same paper, the adult male is said to come from the Strait of Magellan. In his 1890 paper, Schimkewitsch (p. 329) situates the Abrolhos Islands on the coast of South America, but in 1930 (p. 237) he situates them West of Australia. The former position no doubt is correct.

The present material corresponds not entirely with Schimkewitsch' description (1890), but it fits in some important details. It is uncertain whether the female and the male in Schimkewitsch' collections, from widely different localities, are really one and the same species.

At any rate, Schimkewitsch' male and the present male agree with one another (and disagree from other South American members of *Pallenopsis* in this respect) in the combination of the following characters: (1) a slender propodus; (2) a second oviger segment that is as long as segment 4; (3) a very elongated 2nd coxa.

Deviations from Schimkewitsch' description and figures may partially or entirely be explained by the time elapsed since 1890, in correlation with the changed methods of study and description. So, the setation of the legs, especially of coxa 2, is less pronounced in the original paper (however, the setation is subject to great variation in other species, e.g. *P. forcifer*). The fingers of the chelae of the ♂ seem longer, but Schimkewitsch' figure 25 is probably incorrect due to the perspective. The cement gland duct (Schimkewitsch, fig. 28) seems a little longer than in our specimen.

The points of correspondence, however, appear to be much stronger than the points of disagreement.

Measurements in mm of a female and a male, respectively, are as follows: length (tip proboscis to tip 4th lateral process), 5.1 and 5.2; width across 2nd lateral processes, 2.3 and 2.3; length proboscis (ventral), 2.0 and 2.0.

The length of the articles of leg 3 (♀) in mm are: coxa 1, 0.76; coxa 2, 2.16; coxa 3, 0.79; femur, 4.86; tibia 1, 5.53; tibia 2, 5.46; tarsus, 0.25; propodus, 1.37; claw, 0.72; auxiliary claws, 0.47.

The length of the articles of leg 1 (♂) in mm are: coxa 1, 0.90; coxa 2, 2.52; coxa 3, 0.97; femur, 5.80; tibia 1, 6.12; tibia 2, 7.45; tarsus, 0.22; propodus, 1.48; claw, 0.79; auxiliary claws, 0.45.

Contrary to what I supposed earlier (1957b: 102, in key) on the basis of Schimkewitsch' description, the ♀ oviger is 10-segmented. The shortness of the 5th segment in this sex is very characteristic for *P. meinerti*.

Pallenopsis (Pallenopsis) kempfi n. sp.

Figs. 28-29

Material.—Brazil: 1 ♀ (holotype). SALDANHA Sta. 1793B II: 04°13.5′ N 50°26.0′W; 75 m; 18-XI-1967. (ZMA).—French Guiana: 1 ♂, 4 ♀. LUYMUS O.C.P.S. II Sta. M 98: 07°10.6′N 53°50.7′W; abt. 85 m; 16-IV-1969. (RMNH and ZMA).—Surinam: 2 ♂, 1 ♀. LUYMUS O.C.P.S. II Sta. M 86: 06°36.2′N 54°00.1′W; 42 m; 11-IV-1969. (RMNH).—1 ♀. LUYMUS Guyana Shelf Exped. Sta. 63: 07°35′N 57°04′W; 71 m; sandy bottom; 31-VIII-1970. (RMNH).—2 ♂, 4 ♀. LUYMUS O.C.P.S. II Sta. L 90: 06°48.0′N 54°11.4′W; 45 m; 12-IV-1969. (RMNH).—1 ♀. SNELLIUS O.C.P.S. Sta. G 56: 07°15.6′N 56°40.0′W; 68-67 m; 10-V-1966. (RMNH).—1 ♀. SNELLIUS O.C.P.S. Sta. H 58: 07°25.4′N 56°54.4′W; 66 m; 11-V-1966. (RMNH).—Guyana: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 65: 07°33′N 57°05′W; 63 m; sandy bottom; 31-VIII-1970. (RMNH).

Description.—FEMALE (holotype): Body slender, the lateral processes are separated by almost twice their own diameter. Abdomen long, directed obliquely upward. Mid-dorsal line with a few minute setules only, like the distal end of the lateral processes.

The proboscis is almost cylindrical. The ocular tubercle has the shape of a truncated cone. Eyes well-pigmented, lateral sense organs present.

Chelifore scape 1-segmented. Chelar palm nearly twice as long as wide, fingers short; immovable finger with the usual convex inner margin and recurved tip. Spiny cushion low.

Palps present as thumb-shaped buds.

Oviger 8-segmented. Segment 4 the longest; segments 2 and 5 elongated, of about equal length. Segments 6, 7, and 8 diminishing in length. Terminal armature consisting of irregularly placed, spine-like setae. (In very old females, segments 6 and 7 may be more elongated than in the illustrated oviger of the holotype).

Legs slender. Coxa 2 very elongated. Tibia 1 with the longest setal armature. The long leg segments about equal in length. Propodus slender; 5 long spines and some shorter ones distributed over the propodal sole; heel poorly defined. Auxiliary claws markedly less than half as long as the main claw. Sexual pores distinct, on the ventral surface of coxa 2 of all legs.

MALE: Oviger 10-segmented; segment 2 shorter than segment 4; segment 6 curved; segment 10 small, armed with several long, irregularly implanted stiff setae.

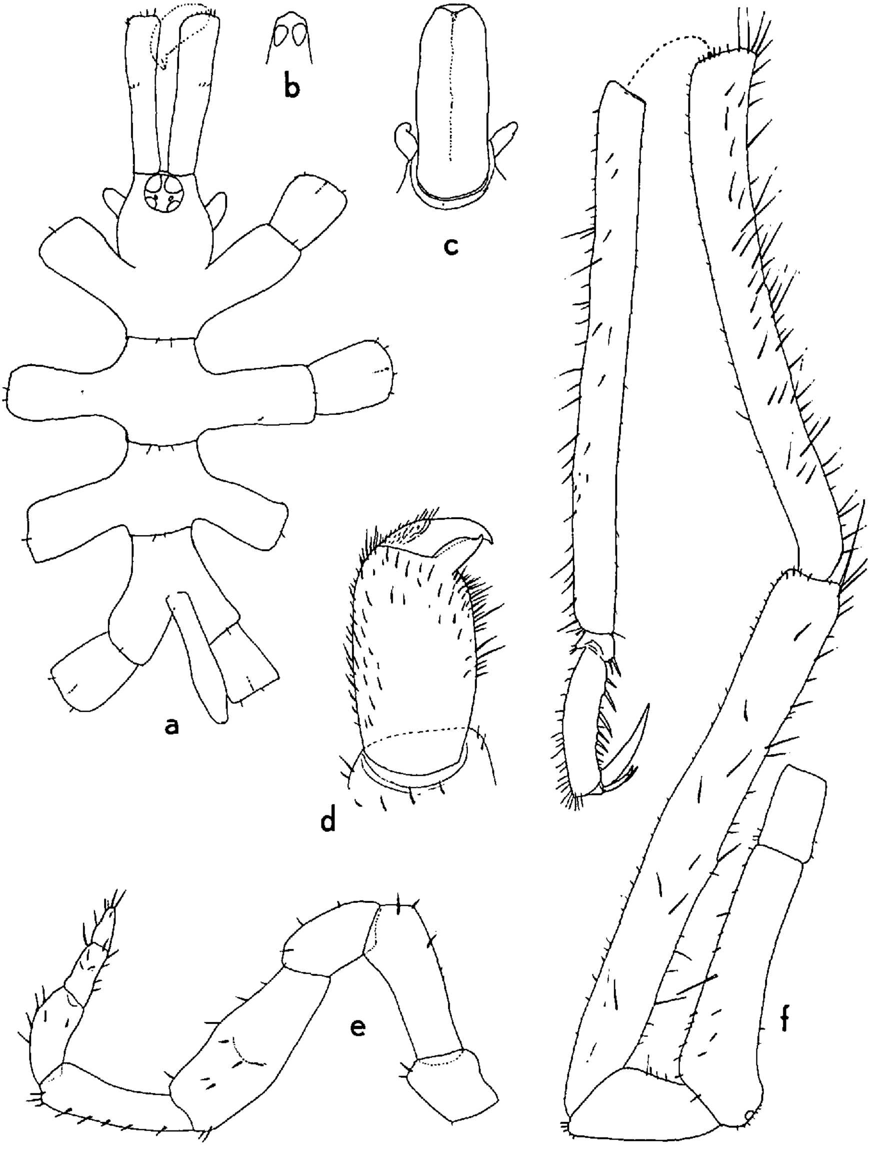

FIGURE 28. *Pallenopsis* (*Pallenopsis*) *kempfi* n. sp., holotype ♀. a, trunk, dorsal (scale 17); b, ocular tubercle, frontal (free-hand sketch); c, proboscis, ventral (17); d, chela (18); e, oviger (18); f, second leg (17). From SALDANHA Sta. 1793B II.

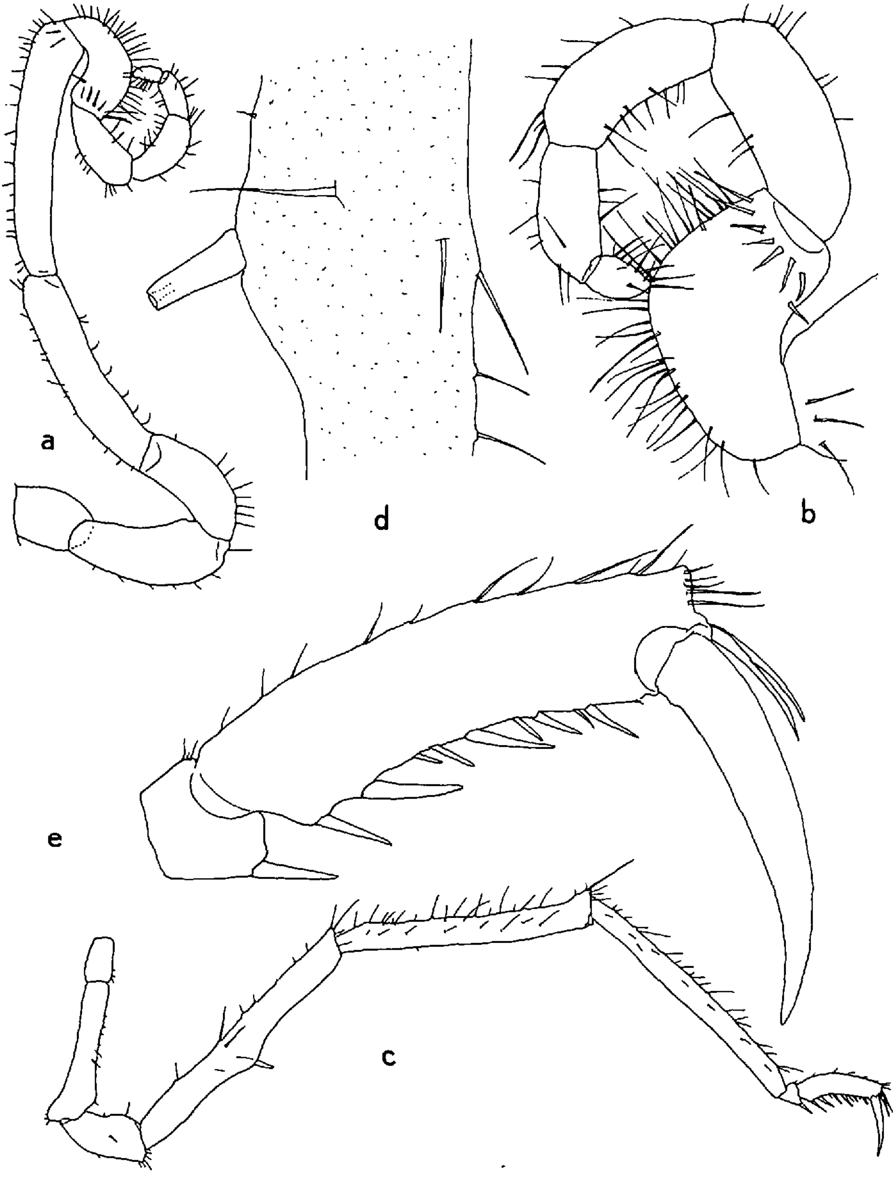

FIGURE 29. *Pallenopsis* (*Pallenopsis*) *kempfi* n. sp., ♂. a, oviger (scale 2); b, distal portion of oviger (12); c, leg (37); d, cement gland (1); e, distal leg segments (1). From SNELLIUS O.C.P.S. Sta. L 90.

Femur and tibia 2 subequal; auxiliary claws short and thin. Cement gland duct about half as long as the femoral diameter. Genital process (on ventral side of coxa 2 of legs 3 and 4) low.

Remarks.—Superficially, this species resembles *P. schmitti* Hedgpeth, 1943, in the slenderness of body and lateral processes, in the setation of the first tibia, and in the low spiny cushion on the chela. It differs, however, clearly from *schmitti* in the propodus (slender shape, auxiliaries short), and in the length of the cement gland duct (merely half as long as the femoral diameter).

Derivatio nominis.—This species is named in honour of Dr. M. Kempf, formerly of Recife, now of Rio de Janeiro, who accumulated the large and interesting collection of Pycnogonida from the coasts of Brazil on which part of this paper is based.

Measurements of the holotype in mm are: length trunk (frontal margin cephalic segment to tip 4th lateral process), 7.0; and width across 2nd lateral processes, 4.0.

Measurements of the second leg in mm are: coxa 1, 1.2; coxa 2, 3.5; coxa 3, 2.0; femur, 7.3; tibia 1, 7.3; tibia 2, 7.7; tarsus, 0.3; propodus, 2.0; claw, 1.48; and auxiliary claw, 0.63.

Pallenopsis (Pallenopsis) schmitti Hedgpeth, 1943

Fig. 30c-d

Pallenopsis schmitti.—Stock, 1955b: 233; Hedgpeth, 1954: 427.

Material.—Florida: 1 ♂. Silver Bay Exped.: about 27°30′-30°N 80°-81°W; 14-81 fms; IV-V-1960. (RMNH).—1 ♀. Gerda Sta. 423: 26° 07′N 80°05′W-26°08′N 80°04′W; 55 m; 22-IX-1964. (UMML).—1 ♂. Gerda Sta. 379: 24°31′N 81°05′W-24°34′N 81°08′W; 128 m; 17-IX-1963 (ZMA).—2 ♂ 1.75 mi. E.N.E. of Hillsboro Light; 125 ft; rock and broken shell; 5-VI-1945; L. A. Burry coll. (AHF).—Honduras: 3 ♀. Pillsbury Sta. 574: 16°16′N 82°26.5′W-16°18′N 82°27′W; 36.6 m; 20-V-1967. (ZMA).—Colombia: 1 ♂. Pillsbury Sta. 372: 09°45′N 76°12′W-09°48′N 76°09.6′W; 100-81 m; 13-VII-1966. (ZMA).—1 ♂. Pillsbury Sta. 392: 09°45.1′N 76°09.1′W-09°45.4′N 76°10.8′W; 78-74 m; 16-VII-1966. (UMML).—Venezuela: 1 ♀. Velero III Sta. A 15-39: 12°24′ 37″N 71°47′25″W-12°24′23″N 71°47′31″W; 9-10 fms; bottom coralline; 8-IV-1939. (AHF).—Guyana: 1 ♂ ovig., 2 ♂. Luymus Guyana Shelf Exped. Sta. 75: 06°43′N 57°17′W; 25 m; sand, bryozoans; 31-VIII-1970. (RMNH).—Surinam: 1 ♀. Snellius O.C.P.S. Sta. F 40: 07°00.2′N 56°26.5′W; 58 m; 6-V-1966. (RMNH).—1 ♂. Luymus O.C.P.S. II Sta. K 91: 06°35.8′N 54°30′W; 37 m; 14-IV-1969. (RMNH).—1 ♀.

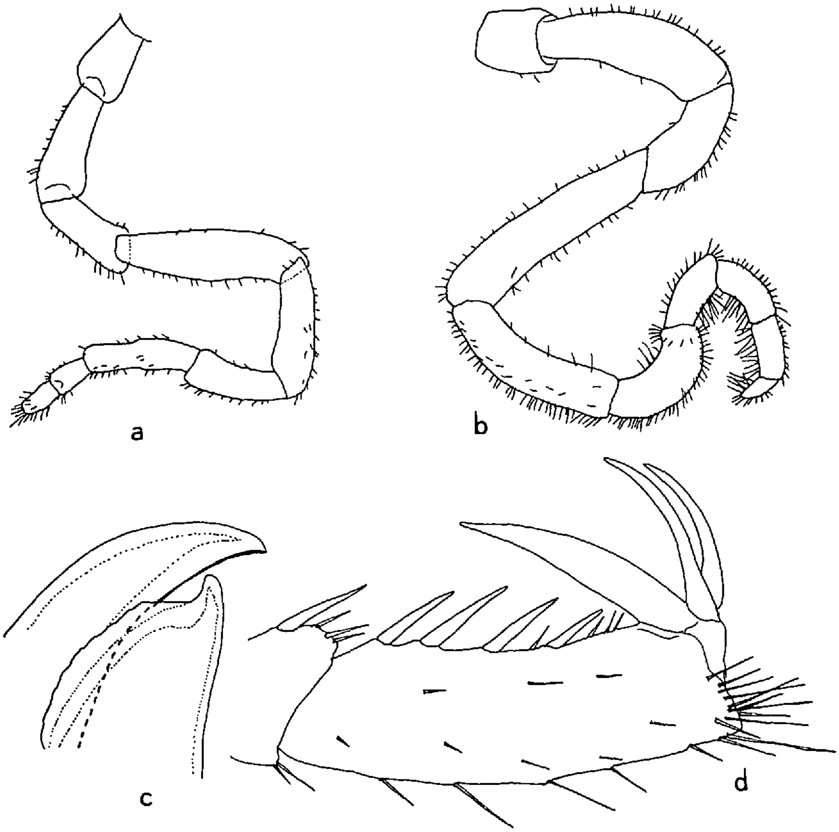

FIGURE 30. a-b, *Pallenopsis* (*Pallenopsis*) *forcifer* Wilson, 1881. a, oviger, ♀ (scale 3); b, oviger, ♂ (3). From GERDA Sta. 66. c-d, *Pallenopsis* (*Pallenopsis*) *schmitti* Hedgpeth, 1943, ♂. c, tip chela (scale 6); d, distal segments of first leg (1). From SALDANHA Sta. 178.

LUYMUS O.C.P.S. II Sta. M 85: 06°28.7'N 54°02.2'W; abt. 36 m; 11-IV-1969. (RMNH).—1 ♂ ovig. LUYMUS O.C.P.S. II Sta. M 86: 06°36'N 54°00.1'W; 42 m; 11-IV-1969. (ZMA).—French Guiana: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 11: 06°03'N 53°41'W; 27 m; mud; 25-VIII-1970. (RMNH).—Brazil: 2 juv. SALDANHA Sta. 1773A: 02°28.0'N 48° 13.5'W; 85 m; 14-XI-1967. (ZMA).—1 ♂, 1 ♀. SALDANHA Sta. 1813: 01°29.0'S 43°19.0'W; 83 m; 28-XI-1967. (ZMA).—1 ♂. SALDANHA Sta. 1718: 02°07.0'S 40°36.0'W; 71 m; 28-X-1967. (ZMA).—1 ♀. SALDANHA Sta. 1708: 02°44.0'S 39°01.5'W; 66 m; 22-X-1967. (ZMA).—1 ♀. SALDANHA Sta. 1687: 04°44.0'S 36°03.0'W; 73 m; 18-X-1967. (ZMA).

Remarks.—The number of long setae on the first tibia is variable, but some long setae are always present at least.

Up to now, this species was not recorded South of the equator.

In some females the oviger is 8-segmented, as illustrated by Stock, 1955b, fig. 10; but in others it is 9-segmented.

Pallenopsis (*Pallenopsis*) *candidoi* de Mello-Leitão, 1949

Fig. 31a-b

Pallenopsis candidoi de Mello-Leitão, 1949: 299-307, pls. IX-X; Stock, 1957: 105, figs. 19-20; Stock, 1966: 393.

Material.—Surinam: 1 ♀. SNELLIUS O.C.P.S. Sta. H 52: 06°50.3'N 56° 59.2'W; 39 m; 9-V-1966. (RMNH).—1 ♂. SNELLIUS O.C.P.S. Sta. F 46: 06°18.7'N 56°34.2'W; 29-26 m; 7-V-1966. (RMNH).—1 ♂. SNELLIUS O.C.P.S. Sta. E 61: 06°17.1'N 56°18.8'W; 35 m; 12-V-1966. (RMNH).—1 juv. SNELLIUS O.C.P.S. Sta. D 32: 06°44.5'N 55°59.6'W; 49.5 m; 3-V-1966. (RMNH).—Brazil: 1 ♀. SALDANHA Sta. 1804B: 00°09.5'S 46°55.5'W; 24 m; 25-XI-1967. (ZMA).—1 ♂ ovig., 1 ♂. CANOPUS Sta. 14: 01°30'S 38°48'W; 47 m; 12-VII-1965. (ZMA).—1 ♂. CANOPUS Sta. 1: 02°05'S 41°20'W; 60-65 m; 26-V-1965. (ZMA).—1 ♀. SALDANHA Sta. 1711: 02°25.0'S 39°30.5'W; 49 m; 27-X-1967. (ZMA).—1 ♀. SALDANHA Sta. 1668: 03°53.0'S 32°37.2'W; 60 m; 10-X-1967. (ZMA).

Remarks.—Up to now, this species was only known from southern Brazil (18°18'-27°30'S).

Pallenopsis (*Pallenopsis*) *forcifer* Wilson, 1881

Fig. 30a-b

Pallenopsis forcifer.—Hedgpeth, 1948: 209 (refs.).

Material.—Georgia (U.S.A.): 1 juv. PILLSBURY Sta. 105: 30°58'N 79° 42'W; 388-403 m; 27-VII-1964. (ZMA).—Florida (U.S.A.) and Bahamas: 1 ♀. PILLSBURY Sta. 197: 27°59'N 79°20'W; 586-567 m; 11-VIII-1964. (ZMA).—3 ♀, 1 ♂ ovig., 1 ♂. GERDA Sta. 66: 25°25.5'N 79°59'W-25°31'N 79°57'W; 366 m; 26-IX-1962. (UMML).—1 ♂, 2 ♀, 2 juv. GERDA Sta. 67: 25°31'N 79°57'W-25°30'N 79°56'W; 351 m; 26-IX-1962. (ZMA).—1 ♂ ovig. GERDA Sta. 76: 25°28'N 80°00'W-25°31'N 79°57'W; 344-348 m; 28-IX-1962. (ZMA).—1 ♂, 1 ♀. GERDA Sta. 77: 25°29'N 79°54.5'W-25°33'N 80°02'W; 329-339 m; 28-IX-1962. (ZMA).—1 ♂. GERDA Sta. 93: 25°03'N 79°45'W-25°08'N 79°44'W; 733 m; 19-IV-1963. (ZMA).—1 ♀. GERDA Sta. 122: 24°02.5'N 82° 03.5'W; 686-715 m; 19-VI-1963. (ZMA).—1 ♂ ovig., 1 ♂. GERDA Sta.

142: 24°15'N 80°05'W-24°16'N 79°59'W; 540-549 m; 22-VI-1963. (ZMA).—1 ♀. Gerda Sta. 154: 26°18'N 79°22'W-26°29'N 79°20'W; 549 m; 25-VI-1963. (ZMA).—1 ♂ ovig., 1 ♂, 3 ♀. Gerda Sta. 158: 26°27'N 79°21'W-26°36'N 79°24'W; 540-531 m; 25-VI-1963. (UMML). —1 ♀. Gerda Sta. 161: 26°37'N 79°50'W; 412-421 m; 26-VI-1963. (UMML).—1 ♀. Gerda Sta. 177: 27°17'N 79°34'W-27°20'N 79°34'W; 686 m; 30-VI-1963. (ZMA).—1 ♀, 1 juv. Gerda Sta. 190: 27°57'N 78° 07'W; 733-897 m; 4-VII-1963. (ZMA).—1 ♂, 4 juv. Gerda Sta. 220: 24°25'N 80°33.5'W-24°33'N 80°31'W; 304-320 m; 22-I-1964. (ZMA).—1 ♀. Gerda Sta. 226. 24°28'N 80°16'W-24°51'N 79°52'W; 802-805 m; 23-I-1964. (ZMA).—1 ♂. Gerda Sta. 266: 25°39'N 79°58'W-25°45' N 79°57'W; 338-332 m; 29-III-1964. (UMML).—1 ♀. Gerda Sta. 296: 25°36'N 79°23'W-25°42'N 79°23'W; 715 m; 5-IV-1964. (ZMA).—1 ♀. Gerda Sta. 311: 25°41'N 79°31'W-25°47'N 79°34'W; 805-787 m; 24-V-1964. (ZMA).—1 juv. Gerda Sta. 354: 25°39'N 79°32'W-25°42'N 79°30'W; 805-830 m; 24-VIII-1964. (ZMA).—1 ♀. Gerda Sta. 382: 26°10'N 79°37'W-26°24'N 79°39'W; 686-699 m; 18-IX-1964. (ZMA).—1 ♀. Gerda Sta. 386: 27°09'N 79°18'W; 604 m; 19-IX-1964. (ZMA).—1 specimen. Gerda Sta. 580: 24°27'N 81°27'W; 146 m; 14-IV-1965. (ZMA).—1 ♀. Gerda Sta. 646: 25°49'N 79°21'W-25°53'N 79°22'W; 439-531 m; 1-VII-1965. (ZMA).—1 ♂ ovig., 1 ♂, 2 ♀. Gerda Sta. 649: 26°34'N 79°43'W; 494 m; 15-VII-1965. (ZMA).—2 ♀. Gerda Sta. 650: 26°37'N 79°45'W-26°41'N 79°45'W; 476-452 m; 16-VII-1965. (ZMA).—1 ♀. Gerda Sta. 666: 27°48'N 79°15'W-27°52'N 79°15'W; 522 m; 17-VII-1965. (ZMA).—1 ♂ ovig., 1 ♀. Gerda Sta. 667: 27° 52'N 79°15'W-27°57'N 79°16'W; 520-534 m; 17-VII-1965. (ZMA).—1 ♂, 1 juv. Gerda Sta. 715: 26°04'N 79°24'W-26°05'N 79°24'W; 549-512 m; 2-VIII-1965. (ZMA).—2 ♂, 3 ♀, 1 juv. Gerda Sta. 716: 26° 08'N 79°24'W-26°11'N 79°25'W; 544 m; 3-VIII-1965. (ZMA).—1 ♀. Gerda Sta. 766: 25°39'N 80°00'W-25°41'N 80°01'W; 309-297 m; 16-IX-1965. (ZMA).—Trinidad: 1 ♂, 1 ♀. Pillsbury Sta. 478: 11°34.4' N 62°10.7'W-11°32.0'N 62°07.2'W; 598-576 m; 2-VIII-1966. (ZMA).

Remarks.—This large series of specimens enables me to say something about the variability. In general young specimens tend to be more pubescent than older ones; such younger specimens have often long setae on the body, the abdomen, the lateral processes, and the legs.

A male from Gerda Sta. 715 has a normal knob-like palp rudiment on the one side of the cephalon, a slender, finger-shaped one on the other.

The female oviger in this species is 9-segmented, through fusion of the original segments 7 and 8.

This is one of the most common Pycnogonida off the Florida coast, roughly between 300 and 850 m of depth. The specimen from GERDA Sta. 580 came from unusually shallow waters (146 m). The record from PILLSBURY Sta. 478 (off Trinidad) constitutes the southernmost locality known for this species.

Pallenopsis sp.

Unidentifiable juveniles, or fragmentary specimens of *Pallenopsis* have been found at AKAROA Station 5C and at SALDANHA Stations 1668, 1688, and 1754 (all on the coasts of Brazil).

Bathypallenopsis n. subgen.

Diagnosis.—Subgenus of *Pallenopsis.* Fingers equal to, or longer than the palm, slender, curved, gaping when closed and oriented more or less in prolongation of the palm. Scape consisting usually of 2 well-articulated segments. No spiny cushion. Auxiliary claws absent or small (less than ⅛ of the main claw).

Type–species.—*Pallenopsis* (*Bathypallenopsis*) *paramollis* n. sp.

This subgenus can be divided into 3 species groups, the members of which are mutually exceedingly similar.

Group 1, which is called here the *tydemani*-group, has a styliform proboscis (i.e., the proboscis is not expanded at all at the tip). This group includes species like *P.* (*B.*) *tydemani* Loman, 1908; *P.* (*B.*) *stylirostrum* Hedgpeth, 1949; *P.* (*B.*) *stschapovae* Turpaeva, 1957; *P.* (*B.*) *tritonis* Hoek, 1883 (= *P.* (*B.*) *holti* Carpenter, 1905); *P.* (*B.*) *californica* Schimkewitsch, 1893. A new subspecies of *P.* (*B.*) *tydemani* is recorded in the present paper, and *P.* (*B.*) *californica* is redescribed.

Group 2, which is called here the *longirostrum*-group, has a proboscis which is expanded and widest at the tip. Here belong *P.* (*B*). *longirostrum* Wilson, 1881; *P.* (*B.*) *plumipes* Meinert, 1899; and *P.* (*B.*) *oscitans* (Hoek, 1881) (three species that are considered synonymous by Hedgpeth, 1948, but not by Barnard, 1954), as well as the uniunguiculate species *P.* (*B.*) *calcanea* Stephensen, 1933; *P.* (*B.*) *scoparia* Fage, 1956; and *P.* (*B.*) *juttingae* Stock, 1964. In the present collections, this group is not represented.

Group 3, which is called here the *mollissima*-group, has a "normal" proboscis, i.e., the proboscis is expanded at the tip, but still more expanded (the widest) in the middle. Here belong *P* (*B.*) *villosa* Hodgson, 1907; *P.* (*B.*) *meridionalis* Hodgson, 1914 (an imperfectly known species); *P.* (*B.*) *annandalei* Calman, 1923; *P.* (*B.*) *antipoda* Clark, 1972; *P.* (*B.*) *longiseta* Turpaeva, 1957; and the species complex centered around *P.* (*B.*) *mollissima* (Hoek, 1881). Various sibling species of the last-named complex are described in the present paper.

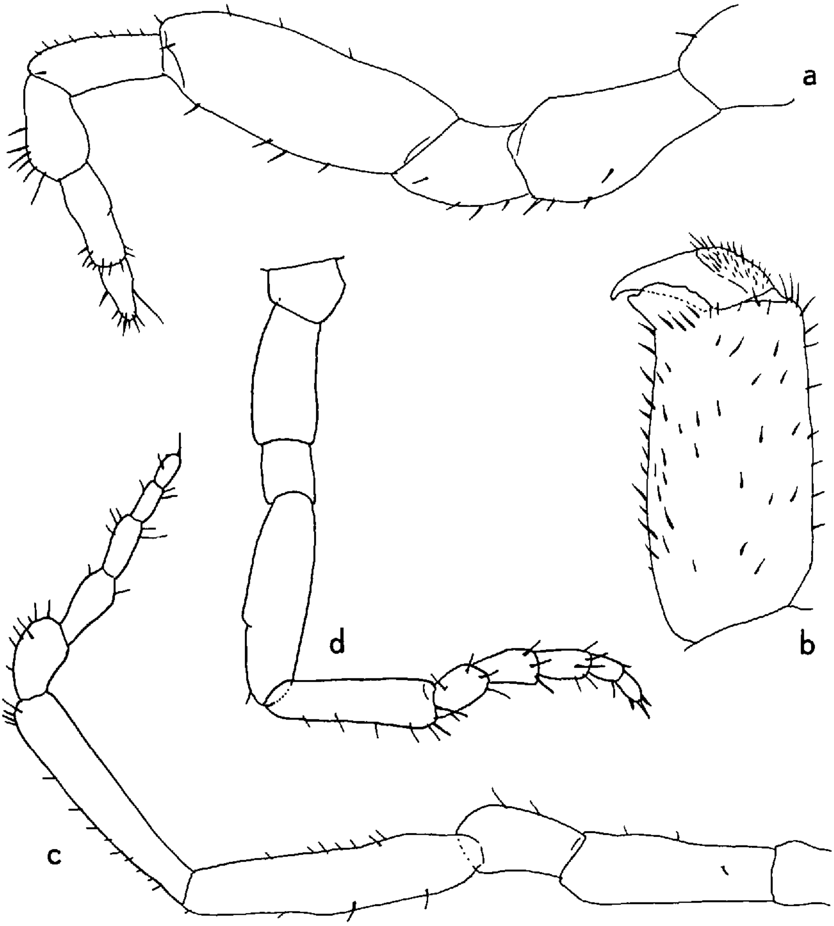

FIGURE 31. a-b, *Pallenopsis* (*Pallenopsis*) *candidoi* de Mello-Leitão, 1949, ♀. a, oviger (scale 1); b, chela (1). From SALDANHA Sta. 1668. c, *Pallenopsis* (*Bathypallenopsis*) *tydemani tydemani* Loman, 1908, syntype ♀: oviger (scale 19). From SIBOGA Sta. 314. d, *Pallenopsis* (*Bathypallenopsis*) *tydemani caraibica* n. ssp., holotype ♀: oviger (scale 19). From GERDA Sta. 366.

GROUP 1: THE *tydemani*-GROUP

Pallenopsis (*Bathypallenopsis*) *tydemani* Loman, 1908 *caraibica* n. subsp.

Figs. 31d, 32

Material.—Florida: 1 ♀ (holotype), 1 ♀ (paratype). GERDA Sta. 366: 24°12'N 81°17'W-24°13'N 81°08'W; 679-709 m; 15-IX-1964. (USNM).—

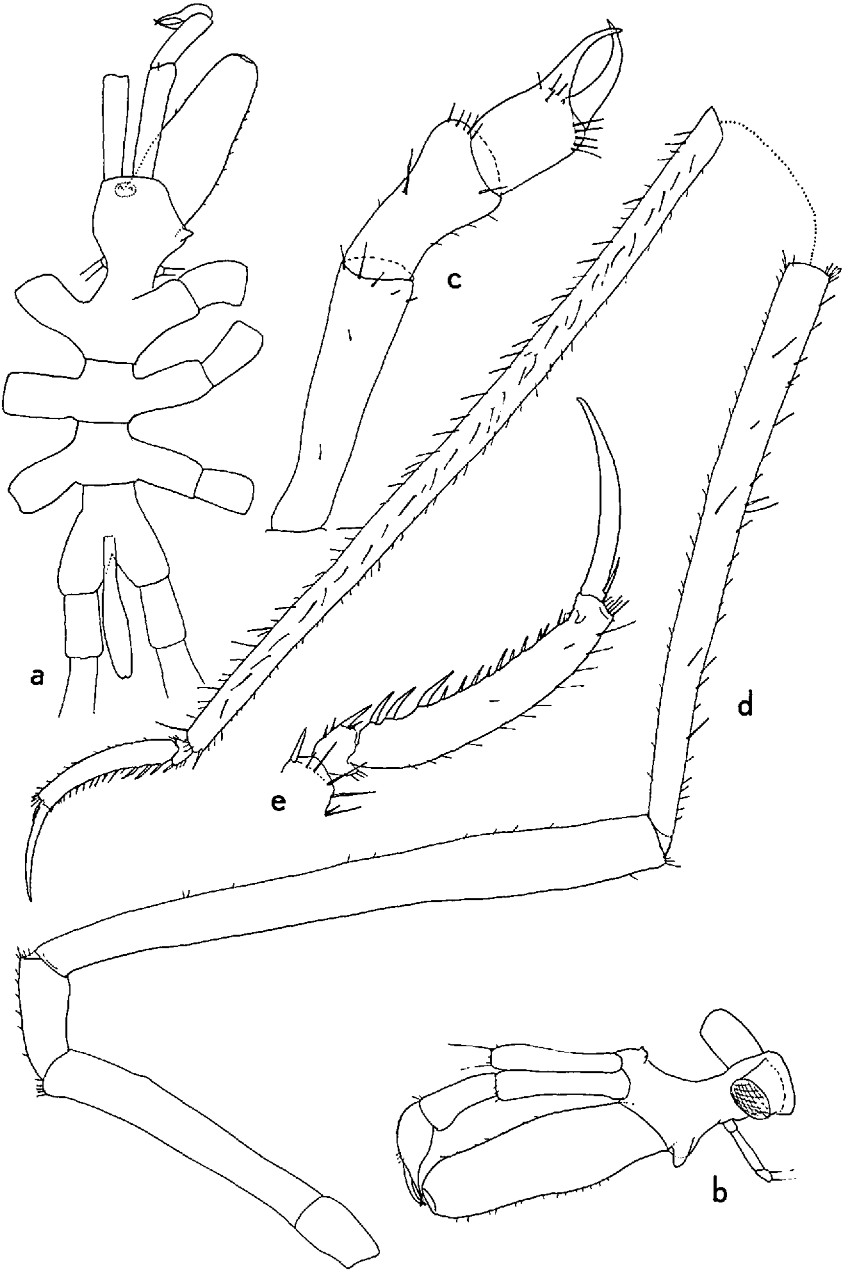

FIGURE 32. *Pallenopsis* (*Bathypallenopsis*) *tydemani caraibica* n. ssp., ♀. a, trunk, dorsal (20); b, cephalic segment from the left (20); c, chelifore (21); d, third leg (20); e, distal segments of 3rd leg (21). Fig. 32a, b, and e from the holotype; c and d from the paratype (both GERDA Sta. 366).

2 ♀. GERDA Sta. 365: 24°11'N 81°37'W-24°12'N 81°17'W; 672 m; 15-IX-1964. (ZMA).—Bahama Islands: 1 ♀. GERDA Sta. 182: 27°55'N 78°40'W-27°57'N 78°40'W; 860-897 m; 2-VII-1963. (ZMA).

Description.—FEMALE: Body slender. Neck swollen in its anterior part, slightly hood-like around the implantation of the proboscis. Trunk unarmed. Abdomen very long.

Proboscis narrower at the tip than in the middle ("styliform"), provided with short setules.

Ocular tubercle almost absent, reduced to an inconspicuous swelling with two minute distal tubercles. No eyes.

Chelifore scape 2-segmented; segment 1 more than 1½ times as long as segment 2. Chela with curved, gaping fingers that are about as long as the palm.

Palp rudiments present.

Oviger implantation well in front of the first lateral process. The oviger in this sex (and in this subspecies) is particularly feeble. Segments 4 and 5 are less than 4 times as long as wide; segments 6 to 10 are more or less rectangular and subequal. The armature of the distal segments consists of a few irregularly placed setae per article.

The legs are very slender. Coxa 2 is exceedingly elongated (about 7 times as long as wide). Tibia 2 the longest segment. No spurs or knobs on the legs. Armature chiefly limited to tibiae 1 and 2, best developed on the latter segment which bears, in addition to shorter dorsal and ventral setae, a row of conspicuous setae on each lateral side. Propodus slender (more than 5 times as long as wide) with 3 strong basal spines and some 10 shorter sole spinules. Auxiliary claws very short, about ⅕ of the main claw.

Measurements of ♀ in mm are: length trunk (frontal margin neck to tip abdomen), 7.0; width across 2nd lateral processes, 3.3; length proboscis (ventral), 3.4; length chela, 1.33; scape segment 1, 1.84; and scape segment 2, 1.08. Oviger segment 1, 0.25; segm. 2, 0.58; segm. 3, 0.25; segm. 4, 0.85 × 0.27; segm. 5, 0.73 × 0.19; segm. 6, 0.28; segm. 7, 0.28; segm. 8, 0.25; segm. 9, 0.15; and segm. 10, 0.11. Third leg: coxa 1, 1.2; coxa 2, 3.9; coxa 3, 1.4; femur, 8.8; tibia 1, 8.2; tibia 2, 11.2; tarsus, 0.18; propodus, 1.91; claw, 1.33; and auxiliary claws, 0.27.

Remarks.—The present material belongs to the *tydemani*-group of the subgenus *Bathypallenopsis.* Four species of this group have eyes and an ocular tubercle (viz., *profunda*, *stschapovae*, *tritonis*, and *stylirostrum*); the only blind species, with a vestigial ocular tubercle, is *tydemani.* The present Caribbean material agrees with the Indo-West Pacific *tydemani* not only in the vestigial eye tubercle, but is—as I could confirm by re-examination of Loman's type-material of *tydemani*—in its remaining morphology very similar to it.

The only difference that I could find is the stronger development of the ♀ oviger, at roughly the same body size, in the Indo-West Pacific material. In Fig. 31c the ♀ oviger of one of the syntypes of *P.* (*B.*) *tydemani tydemani* is illustrated at the same scale as that for a Caribbean female (Fig. 31d). It is evident, that segments 4 and 5 in Loman's type are much more elongate and slender, segment 6 has a more swollen shape, and segment 7 is more slender in comparison with the Caribbean material. The length (in mm) of the oviger segments 1 to 10 in the ♀ syntype of *tydemani tydemani* is as follows; 0.33, 1.00, 0.53, 12.8 × 0.29, 1.13 × 0.23, 0.33, 0.35, 0.28, 0.18, 0.15.

In the light of the geographic separation between the known records of *P.* (*B.*) *tydemani* s.str. (known from Indonesia and Japan) and the present Floridan and Bermudan records, I have thought it correct to attach subspecific value to the oviger differences mentioned above.

Pallenopsis (*Bathypallenopsis*) *californica* Schimkewitsch, 1893
Figs. 33-34

Pallenopsis californica Schimkewitsch, 1893: 39-41; pl. I fig. 11, pl. II figs. 18-23; Hilton, 1942c: 40.

Material.—1 ♂ (syntype). (USNM 32155). ALBATROSS Sta. 3431: 23° 59'N 108°40'W; 995 fms; 20-IV-1891. (The locality is in the Gulf of California, E. of the southern tip of Baja California).

Remarks.—Schimkewitsch' species has a styliform proboscis, a fact ignored hitherto. It belongs, therefore, to the *tydemani*-group of the subgenus *Bathypallenopsis.* The setae on the legs are longer and less spiniform than the original figure (fig. 11) suggests; they are placed in 4 more or less regular longitudinal rows on femur, tibia 1, and tibia 2.

The cement gland duct is in the present specimen much shorter than in Schimkewitsch' fig. 22. Scape segment 1 measures 2.9 mm, segment 2 is 2.2 mm. The palm of the chela is triangular, as long as wide; the fingers are very long, curved.

A set of new figures of this well-defined species is included in the present paper. On the basis of the original description, *P.* (*B.*) *californica* was thought to be closely related to the *mollissima*-group, but this assumption proved to be erroneous.

I am indebted to Dr. C. A. Child, of the Smithsonian Institution, for the kind help in making a syntype of *californica* available to me for study. No new material of this species has been collected by the cruises of the PILLSBURY in the Gulf of Panamá.

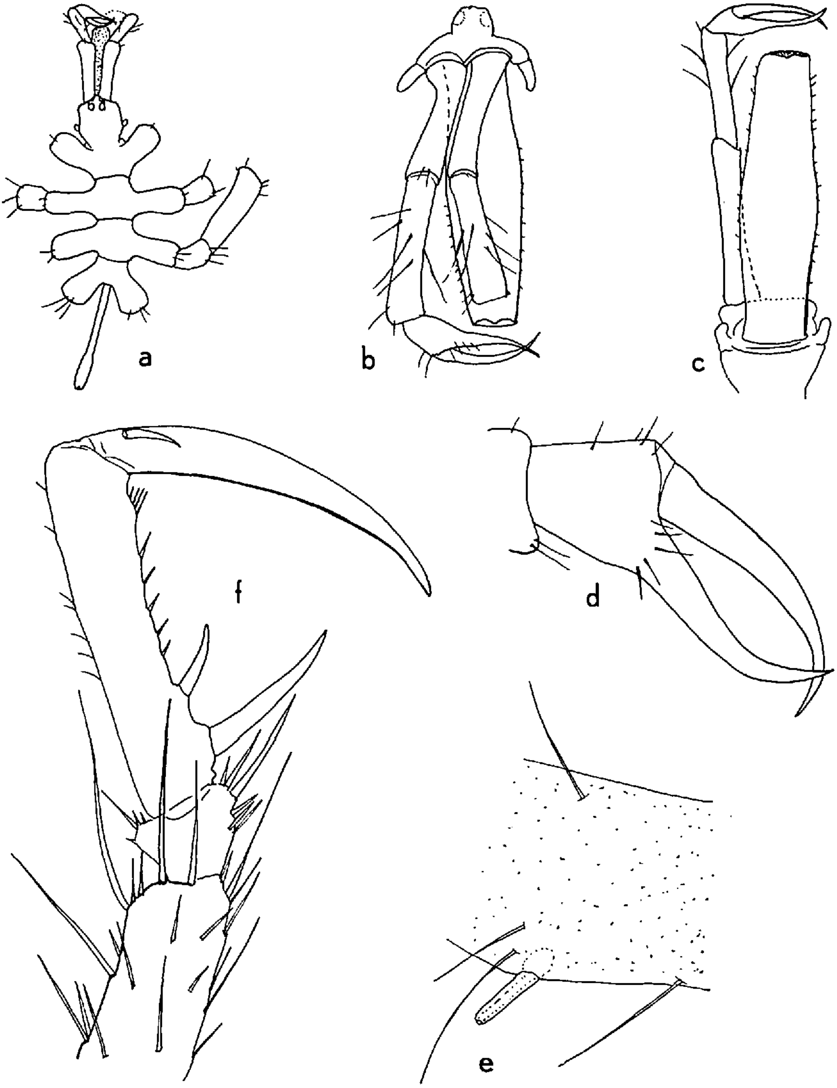

FIGURE 33. *Pallenopsis* (*Bathypallenopsis*) *californica* Schimkewitsch, 1893, syntype ♂. a, trunk, dorsal (free-hand sketch); b, perspective frontal view of the cephalic segment (free-hand sketch); c, proboscis, ventral (free-hand sketch); d, chela (free-hand sketch); e, cement gland (scale 5). From ALBATROSS Sta. 3431.

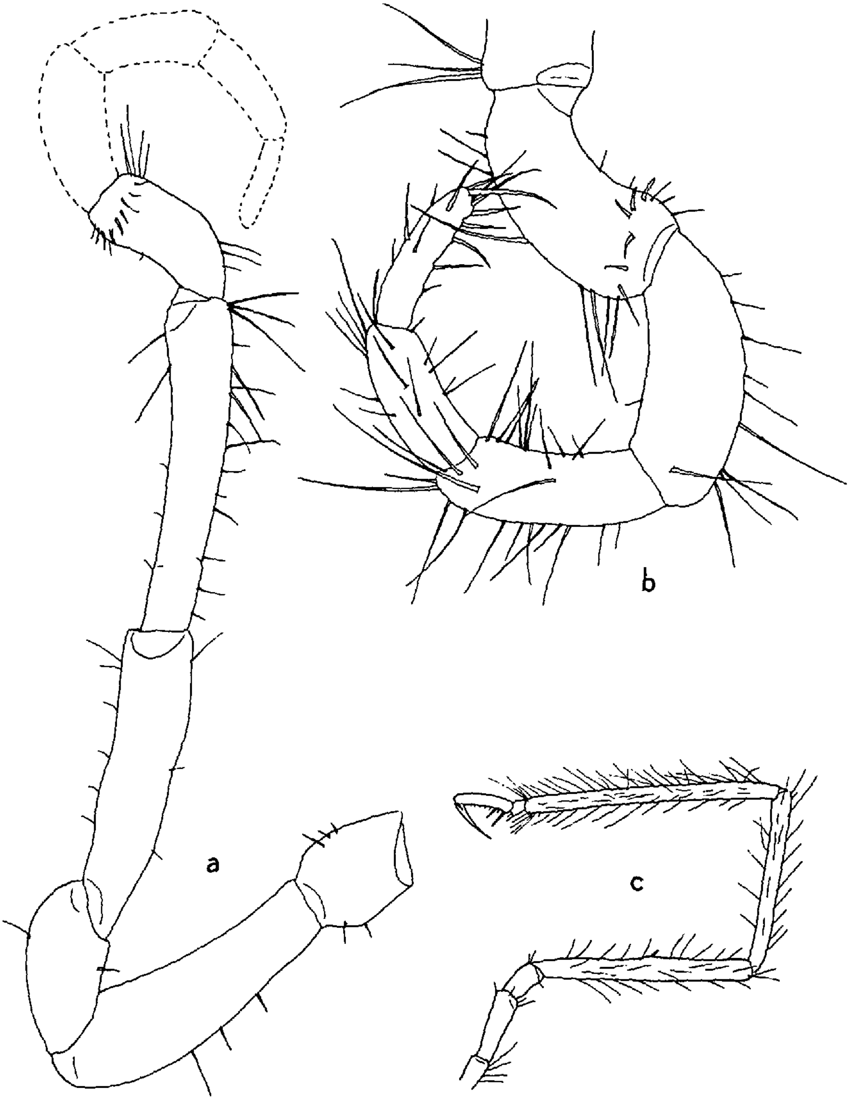

FIGURE 34. *Pallenopsis* (*Bathypallenopsis*) *californica* Schimkewitsch, 1893, syntype ♂. a, oviger (scale 15); b, distal portion of oviger (19); c, first leg (4). From ALBATROSS Sta. 3431.

GROUP 3: THE *mollissima*-GROUP

This is a most difficult group of species. First of all, the unique type-specimen of *P.* (*B.*) *mollissima* (Hoek, 1881), from CHALLENGER Sta.

237 (= off Tokyo, 1875 fms) is badly damaged, lacking the distal segments of all legs. Furthermore, Hoek did not state the sex of the holotype, which is of some importance since the ovigers show strong sexual dimorphism in this genus.

All members of this group are rare deep-sea species, of which only a very limited number of specimens is present in the museum collections.

The present PILLSBURY material made it clear to me that under the name of *P.* (*B.*) *mollissima* hide a number of closely related forms, differing chiefly in the oviger structure, but showing at the same time slight differences in the shape of the chelae, the armature of the propodus, and the setation of the legs.

For the purpose of this study, the holotype of *P.* (*B.*) *mollissima* (Hoek, 1881) has been re-examined; it proved to be a female. New illustrations of the salient features of the holotype are included in this paper. Moreover, the material recorded under the name of *mollissima* by Schimkewitsch, 1893 (from the Gulf of Panamá), Hedgpeth, 1949 (from the Japanese area), and Stock, 1953 (from the Philippines) has been re-studied.

No new material came under my eyes that agrees with the ♀ holotype of Hoek's *mollissima.* It is possible, however, that *P.* (*B.*) *longiseta* Turpaeva, 1957, from the Bering Sea and the Sea of Okhotsk, which is known from males only, represents the unknown male sex of *mollissima.* The male from the Gulf of Panamá, recorded by Schimkewitsch, 1893, as *mollissima*, agrees closely with *longiseta* and I consider it identical with the latter. On the other hand, Hedgpeth's Japanese material differs from *mollissima* in certain features, and is considered to represent a new species. Finally, new species have been created for clearly a distinct form from the Gulf of Panamá, and for a deep-water form from the tropical Atlantic, the latter being the first and only record of a member of the *mollissima*-complex outside the Pacific.

Since some of the "forms" are more or less sympatric, I treat them as separate species.

KEY TO THE SPECIES OF THE *mollissima*-GROUP OF THE GENUS *Pallenopsis* (SUBGENUS *Bathypallenopsis*)*

1a. First scape segment twice as long as the second. .... *P.* (*B.*) *annandalei* Calman, 1923.
b. First scape segment about 1½ times as long as the second or even shorter .... 2.
2a. Body and legs covered with long setae. .... *P.* (*B.*) *villosa* Hodgson, 1907.
b. Long setae, if any, restricted to the tibiae .... 3.

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* *P.* (*B.*) *meridionalis* Hodgson, 1914, is too incompletely known to be included in the key.

3a. Tibiae with rows of long setae (one on the anterior and one on the posterior side of the segment), which are 2 to 4 times as long as the tibial diameter .... 4.
b. Setae on the tibiae not longer than the tibial diameter .... 7.
4a. Scape segment 1 only slightly longer than segment 2. Palm of chela nearly rectangular. Propodal sole with more than 15 spinules. .... *P.* (*B.*) *comosa* n. sp.
b. Scape segment 1 about 1½ times as long as segment 2. Palm of chela nearly triangular. Propodal sole (unknown in *mollissima*) with about 10 spinules .... 5.
5a. Female. Oviger segment 10 spiniferous .... 6.
b. Male. Oviger segment 10 spiniferous. .... *P.* (*B.*) *paramollis* n. sp.
c. Male. Oviger segment 10 setiferous. .... *P.* (*B.*) *longiseta* Turpaeva, 1957.
6a. Oviger segment 6 only slightly more than half as long as segment 5. Oviger segment 7 very hairy. .. *P.* (*B.*) *mollissima* (Hoek), 1881.
b. Oviger segment 6 nearly as long as segment 5. Oviger segment 7 almost bold. .... *P.* (*B.*) *paramollis* n. sp.
7a. Terminal oviger segment (♀) elongate, armed with 8 ventral teeth. Propodal sole with 3 large and 8 very small spines. .... *P.* (*B.*) *guineensis* n. sp.
b. Terminal oviger segment (♀) short, armed with 4 ventral teeth. Propodal sole with 2 very large and 4 less large spines. .... *P.* (*B.*) *antipoda* Clark, 1972.

Pallenopsis (*Bathypallenopsis*) *mollissima* (Hoek, 1881)
Fig. 35

Phoxichilidium mollissimum Hoek, 1881: 87-88, pl. XIII figs. 6-9 (non *Pallenopsis mollissima* auct.).

Material.—1 ♀ (holotype, BMNH 1881.38). CHALLENGER Sta. 237: 34° 37′N 140°32′E, 1875 fms; 17-VI-1875.

Remarks.—Hoek's description and figures are remarkably correct. His figure 9, however, gives a wrong impression of the tibial setation: there are two rows of setae present, the setae being about twice as long as the diameter of the segment.

The chela, not illustrated by Hoek, is characteristic: its palm is about as long as wide, giving a triangular impression; the fingers are much longer than the palm, curved.

Likewise typical is the ♀ oviger: segment 6 is slightly more than half as long as segment 5; segment 7 is elongate, as long as segment 6, and armed with numerous very long setae in its distal half; segment 10 bears a row of 8 spines along its lower margin, distally 2 smooth spines arise.

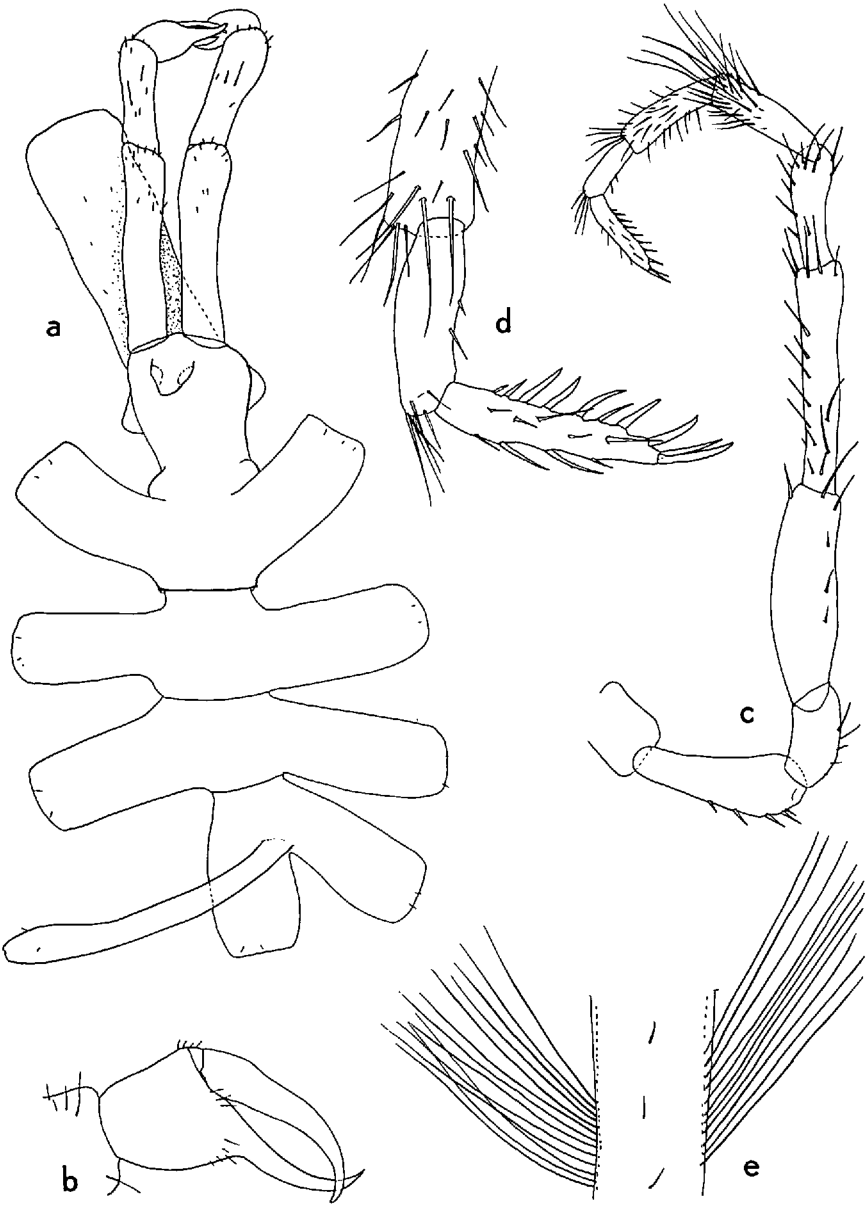


FIGURE 35. *Pallenopsis* (*Bathypallenopsis*) *mollissima* (Hoek, 1881), holotype ♀. a, trunk, dorsal (free-hand sketch); b, chela (scale 17); c, oviger (22); d, distal portion of oviger (18); e, detail of setation of tibia 1 (free-hand sketch). From CHALLENGER Sta. 237.

Measurements of the holotype in mm are: length trunk (frontal margin cephalic segment to tip 4th lateral process), 17.6; width across 2nd lateral processes, 11.8; length abdomen, 7.8; length scape segment 1, 5.6; length scape segment 2, 3.6; length palm, 1.38; greatest diameter palm, 1.32; and length movable finger, 2.16.

Measurements in mm of the fourth leg are: coxa 1, 3; coxa 2, 6.5; coxa 3, 3.5; femur, 30; tibia 1, 28; tibia 2, > 35 (damaged in all legs); tarsus, propodus and claw lacking in all legs.

The Celebes specimen.—A young female, with still incompletely formed ovigers, from ALBATROSS Sta. 5652 (04°35′00″S 121°23′06″E, 525 fms) (cf. Stock, 1953b: 288) might, judging from the shape of the chelae, belong to *P.* (*B.*) *mollissima.*

Pallenopsis (*Bathypallenopsis*) *longiseta* Turpaeva, 1957

Fig. 36

Pallenopsis longiseta Turpaeva, 1957: 359-361, fig. 2.

Pallenopsis mollissima.—Schimkewitsch, 1893 (nec Hoek, 1881): 41-42, pl. II fig. 24.

Material.—Gulf of Panamá: 1 ♂. ALBATROSS Sta. 3360: 06°17′N 82° 05′W; 1672 fms; 1891. (USNM).

Remarks.—The present specimen, recorded by Schimkewitsch under the name of *mollissima*, agrees in every respect with the two males described by Turpaeva, 1957, under the name of *P. longiseta.* This agreement in morphology is the more striking, since Schimkewitsch' material came from Gulf of Panamá, Turpaeva's specimens from the Bering Sea and the Sea of Okhotsk. The ALBATROSS specimen bears a very strong resemblance to the holotype of *Pallenopsis mollissima*, but since the latter is known only from a badly damaged female, it is not possible at present to synonymize *longiseta*, known from males only, with *mollissima.*

P. (*B.*) *longiseta* has chelae with a more or less triangular palm, which is as long as its greatest width, just as in *mollissima.*

In the ♂ oviger, *longiseta* differs from the other species I examined during this study, in that segment 10 carries numerous long, irregularly placed, setiform elements and lacks a distal, claw-like spine.

Contrary to the statement of Schimkewitsch (1893: 41) that the cement gland duct is situated in the basal third of the femur, this duct is, as illustrated by Turpaeva, placed at 9/11 of the length of the femur. On the other hand, the distal leg segments are quite correctly illustrated in Schimkewitsch' fig. 24.

The Panamanian specimen is distinctly larger than Turpaeva's types, as the following measurements (in mm) show: length trunk (frontal margin cephalic segment to tip 4th lateral process), abt. 16 (body curved); width

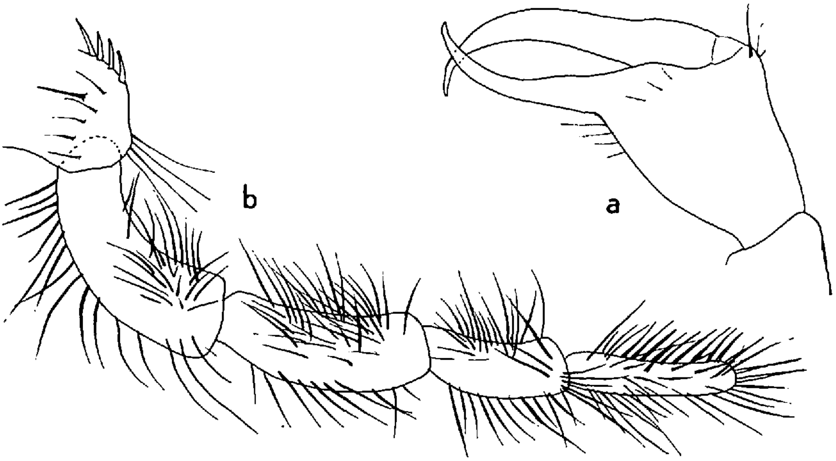


FIGURE 36. *Pallenopsis (Bathypallenopsis) longiseta* Turpaeva, 1957, ♂. a, chela (free-hand sketch); b, distal portion of oviger (scale 3). From ALBATROSS Sta. 3360.

across 2nd lateral processes, 11.2; length abdomen, 8.0; length palm, 1.71; greatest width palm, 1.71; length movable finger, 2.34; scape segment 1, 5.6; and scape segment 2, 3.5. Measurements in mm of the second leg are: coxa 1, 3.0; coxa 2, 8.6; coxa 3, 3.8; femur, 24.2; tibia 1, 27.2; tibia 2, 34.6; tarsus, 0.6; propodus, 4.2; claw, 3.4.

Pallenopsis (Bathypallenopsis) comosa n. sp.

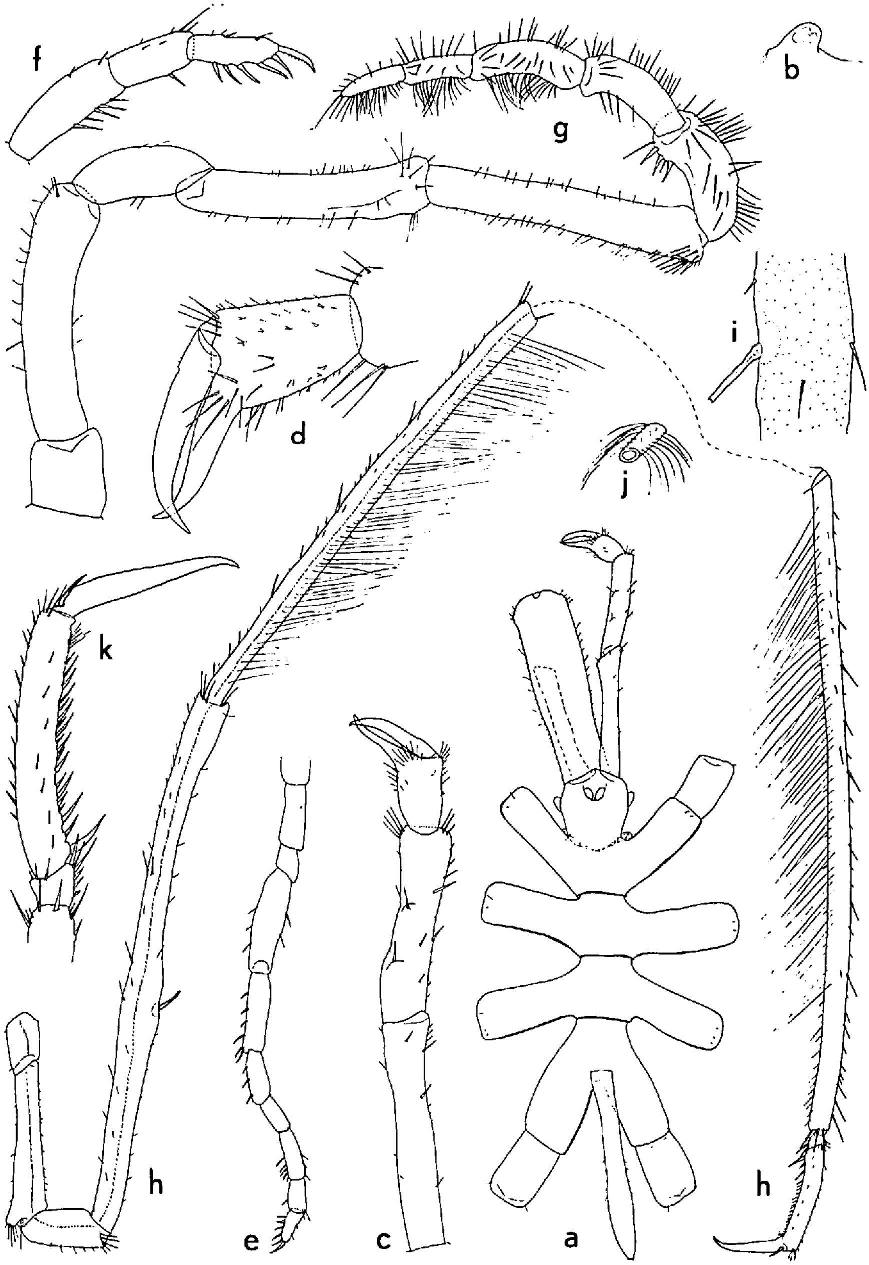
Fig. 37

Material.—Gulf of Panamá: 1 ♂ (holotype), 1 ♂, 1 ♀ (paratypes). PILLSBURY Sta. 526: 06°53'N 79°27'W-06°49'N 79°29'W; 3193-3200 m; 5-V-1967. (Holotype in USNM, paratypes in ZMA).

Description.—Body fairly slender, lateral processes separated by about 1½ times their own diameter. Body smooth, except for some minute setules. Proboscis cylindrical, expanded in the middle and at the tip. Abdomen very long. Ocular tubercle low, rounded; eyes present but poorly pigmented.

Chelifore scape segment 1 only slightly longer than segment 2. Palm nearly rectangular, armed with several setae, 1½ times as long as wide. Fingers straight in their basal part, curved in their distal part; inner margin vaguely crenulated. Spiny cushion practically absent. Immovable finger about as long as the palm, movable finger longer.

Palp knob-like.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Oviger basis in contact with 1st lateral process. Oviger 10-segmented in both sexes. In ♂, oviger segments 2 and 4 subequal, segment 5 only a trifle longer; segment 6 curved; segments 7 to 10 diminish only slightly in length; segments 8, 9, and 10 with numerous long setae. In ♀, the oviger is short; segment 4 is the longest; segment 6 is slightly more than half the length of segment 5; segment 7 is unarmed; segment 10 bears a row of 5 ventral spines; the distal spine is curved, claw-like, and—remarkably enough—bearing some 7 minute denticles at its inner margin.

Legs very slender. The cement gland tube is placed slightly before the middle of the femur, and is shorter than the diameter of the femur. Two rows, one anterior, one posterior, of very long setae on tibiae 1 and 2. Propodus almost straight, slender, with 1 large basal spine, followed by 1 smaller and 1 larger spine, and a row of 16 sole spinules of unequal sizes. Auxiliary claws less than ¼ of the main claw.

Measurements (♂) in mm are: length trunk (frontal margin cephalic segment to tip of 4th lateral process), 10.5; length abdomen, 5.5; length proboscis (ventral), 6.0; scape segment 1, 0.34; scape segment 2, 0.30; length palm, 1.28; greatest width palm, 0.80; length movable finger, 1.35. Length of 3rd leg 90 mm and lengths of segments were: coxa 1, 1.8; coxa 2, 6.4; coxa 3, 2.8; femur, 21.4; tibia 1, 22.0; tibia 2, 28.2; tarsus, 0.40; propodus, 4.0; and claw, 3.0.

Remarks.—The shape of the chela, the structure of the ♀ oviger, the armature of oviger segment 10 (♀), and the subequal scape segments, characterize this species.

The specific name, *comosa* (Latin), means hairy and alludes to the setose tibiae.

The female in the present collection is somewhat smaller than the male, but possesses ovaries in the legs; sexual pores are small. It is not quite certain, therefore, if this female is full-grown.

Pallenopsis (Bathypallenopsis) paramollis n. sp.

Figs. 38-39

Pallenopsis mollissima.—Hedgpeth, 1949: 277, fig. 36f (non Hoek, 1881).

Material.—Japan: 1 ♂ (holotype), 1 ♀ (allotype). ALBATROSS Sta. 4975: 33°21′30″N 135°38′50″E; 545-712 fms; 31-VIII-1906. (USNM 80555).—

←

FIGURE 37. *Pallenopsis* (*Bathypallenopsis*) *comosa* n. sp., holo- and paratypes. a, trunk, ♂, dorsal (free-hand sketch); b, ocular tubercle from the left, ♂ (free-hand sketch); c, chelifore, ♂ (scale 22); d, chela, ♂ (23); e, oviger, ♀ (24); f, distal portion of oviger, ♀ (25); g, oviger, ♂ (22); h, third leg, ♂ (free-hand sketch); i, cement gland on leg 3, ♂ (22); j, transversal section of tibia 2, ♂ (free-hand sketch); k, distal segments of 3rd leg, ♂ (22). All from PILLSBURY Sta. 526.

1 ♀ (paratype). ALBATROSS Sta. 5080: 34°10′30″N 138°40′00″E; 505 fms; 19-X-1906. (USNM 80566).

Description.—Body shape and proboscis similar to the other species of the *mollissima*-group. Ocular tubercle low, truncate, and slightly concave at the top; eyes present but poorly pigmented.

Chelifore scape 2-segmented; segment 1 more than 1½ times as long as segment 2. Chela with a trapezoidal palm, which is distinctly longer than wide; fingers long, curved.

Palp reduced to a low, rounded lobe.

Oviger 10-segmented in both sexes. The ♀ oviger offers some characteristic features: segment 2 is elongated but shorter than the subequal segments 4 or 5; segment 6 very long, as long as segment 2; segment 7 less than half as long as 6, almost devoid of armature; segments 8, 9, and 10 slender, elongate, armed along their lower margin with a regular row of 7, 11, and 6 spines, respectively; in addition, segment 10 bears a strong, claw-like, smooth, terminal spine. The ♂ oviger has long segments 2, 4, and 5; segment 6 is curved, with a sort of distal apophysis bearing some recurved spines; segment 7 is short; segments 8 and 9 are more slender than 7, setiferous; segment 10 is tapering, its lower margin bears 7 spines, of irregular size, and a strong, claw-like, smooth, terminal spine.

Legs slender; tibiae with an anterior and a posterior row of densely implanted, very long setae; coxa 2 more than 2½ times as long as coxa 1; femur slightly longer than tibia 1; tibia 2 the longest segment; propodus resembling that of *P.* (*B.*) *longiseta* Turpaeva, in having 1 smaller, 1 larger, and 1 smaller spine on the heel, and some 8 small spinules on the sole; auxiliary claws about ⅕ of the main claw. Cement gland duct shorter than the femoral diameter situated near the middle of the segment.

Remarks.—Though collected, like the holotype of *P.* (*B.*) *mollissima* (Hoek, 1881) from deep waters off Honshu, this species cannot be identified with it. The main differences are in the chelae, which have a narrower palm and longer fingers in the present species, and in the ♀ oviger, which has in the present species a very long 6th and a very short 7th segment; the latter segment is moreover almost bald in the present species, versus very setose in *mollissima.*

From *P.* (*B.*) *longiseta* Turpaeva, 1957, the present species differs in the chela (just as from *mollissima*) and in the ♂ oviger (segment 10 spinose, versus setose in *longiseta*).

P. (*B.*) *comosa* (described in the preceding pages) has a more rectangular chelar palm, a short 6th oviger segment (♀), a setose 10th oviger segment (♂), and more numerous propodal sole spinules.

P. (*B.*) *guineensis,* described in the sequel, has a shorter 6th oviger segment (♀), shorter chelar fingers, and less setose tibiae.

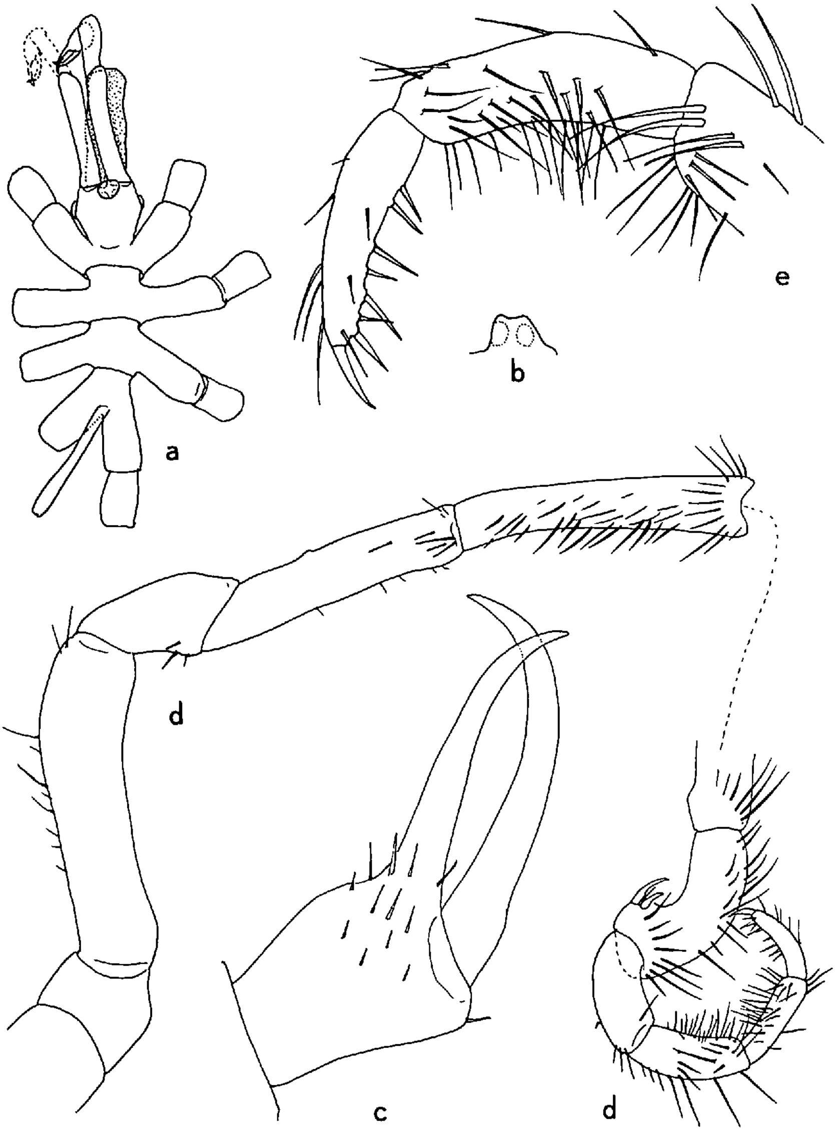

FIGURE 38. *Pallenopsis* (*Bathypallenopsis*) *paramollis* n. sp. a, trunk, ♀, dorsal (scale 26); b, ocular tubercle, ♀, from the right (free-hand sketch); c, chela, ♀ (19); d, oviger, ♂ (3); e, distal portion of oviger, ♂ (1). ♀ from ALBATROSS Sta. 5080, ♂ from ALBATROSS Sta. 4975.

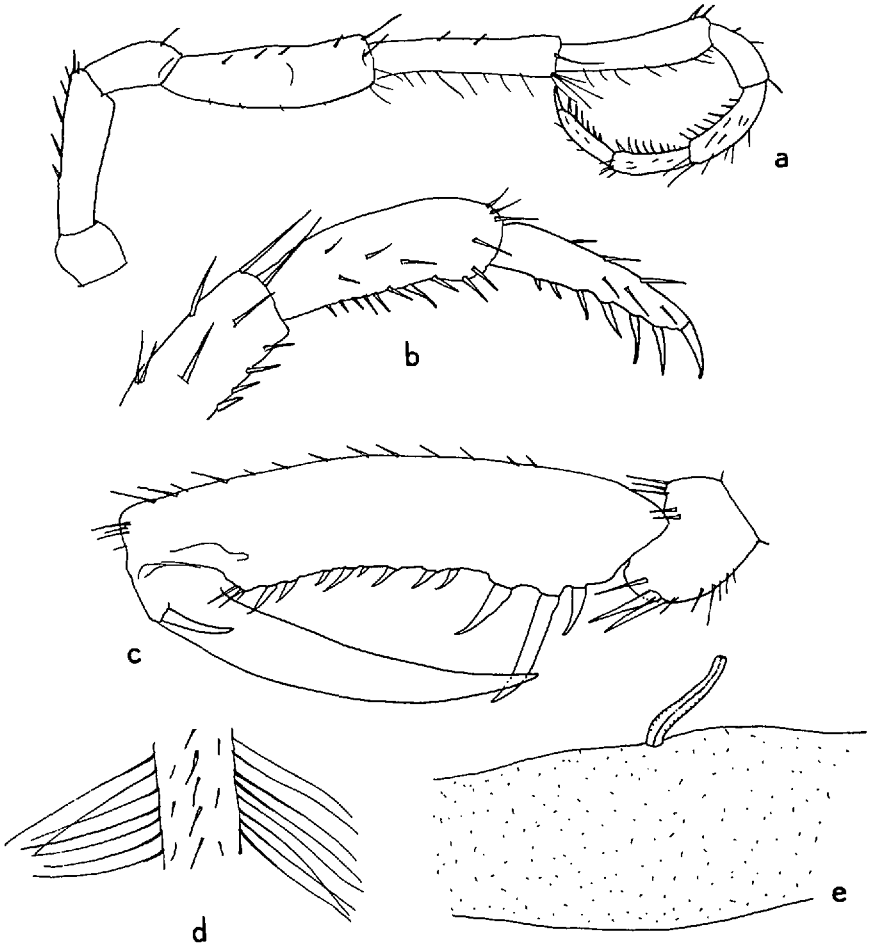

FIGURE 39. *Pallenopsis (Bathypallenopsis) paramollis* n. sp. a, oviger, ♀ (3); b, distal portion of oviger, ♀ (1); c, distal leg segments, ♀ (15); d, detail of setation of tibia 2, ♀ (free-hand sketch); e, cement gland, ♂ (15). ♀ from ALBATROSS Sta. 5080, ♂ from ALBATROSS Sta. 4975.

Measurements (in mm) of a ♀ from ALBATROSS Sta. 4975, are: length trunk (anterior margin cephalic segment to tip of 4th lateral process), 12.0; width across 2nd lateral processes, 7.2; length abdomen, 5.6; length scape segment 1, 4.6; length scape segment 2, 2.8; length palm, 1.20; greatest diameter palm, 0.96; and length movable finger, 1.76.

Measurements of the fourth leg in mm are: coxa 1, 2.4; coxa 2, 6.2; coxa 3, 2.4; femur, 21.6; tibia 1, 19.6; tibia 2, 27.4; tarsus, 0.60; propodus, 4.2; and claw, 2.4.

Pallenopsis (Bathypallenopsis) guineensis n. sp.

Fig. 40

Material.—Gulf of Guinea: 1 ♀ (holotype). PILLSBURY Sta. 34: 03°53′ N 02°33′W; 1949-1986 m; 29-V-1964. (USNM).

Description.—Trunk segmented, smooth. Cephalon short, widened in the middle. Lateral processes slender, much longer than the diameter of the trunk, distally provided with a slightly raised rim; separated by slightly less than their own diameter. Abdomen very long, elevated at an angle of about 30°.

Proboscis slightly swollen in the middle and at the distal end. Ocular tubercle inclined backward, rounded, somewhat tapering. Eyes present, poorly pigmented; lateral sense organs present.

Chelifore scape 2-segmented; segment 1 about 1½ times as long as segment 2; almost unarmed. Chela slender, fingers curved, crossing at the tip, gaping, unarmed.

Palp a finger-shaped rudiment.

Oviger (♀): 10-segmented; segments 4 and 5 slender, 5 hardly shorter than 4; segment 5 with several long, stiff setae; segment 6 slightly more than half as long as segment 5; segment 7 shorter than 8, almost devoid of setae; segments 8, 9, and 10 slender, 8 and 9 with rows of setae, one row of these consisting of longer setae; segment 10 with 8 curved spines in a row along the ventral margin; terminal spine thicker than the others, entirely claw-like in appearance, unadorned.

Legs slender; coxae and femur almost smooth; tibia 1 with some distal, stiff setae; tibia 2 with scattered stiff setae, implanted without clear pattern, shorter than the diameter of the tibia. Propodus gently curved; heel with 3 or 4 basal spines, the central-most of which is the largest; sole with about 8 small spinules. Claw attaining the largest spine of the heel; auxiliary claws small, less than ¼ of the main claw. Genital pores on the ventrodistal end of each 2nd coxa.

Measurements of ♀ in mm are: length (frontal margin cephalic segment to tip of abdomen), 17.0; length proboscis (ventral), 7.0; length palm (from tip scape to base of movable finger), 1.43; length movable finger, 1.50; greatest diameter palm, 1.00; scape segment 1, 5.0; and scape segment 2, 3.4. Measurements of the second leg in mm are: coxa 1, 2.5; coxa 2, 8.0; coxa 3, 3.0; femur, 31.0; tibia 1, 26.0; tibia 2, 36.0; tarsus, 0.8; propodus, 3.7; claw, 2.4; and auxiliary claws, 0.55.

Remarks.—This species is morphologically very close to the Pacific *P.* (*B*). *mollissima* (Hoek, 1881). It differs, however, in the chela (the movable finger is hardly longer than the palm), in the ♀ oviger (oviger segment 7 shorter than 6, 7 almost devoid of setae), and in the absence of long setae on the tibiae.

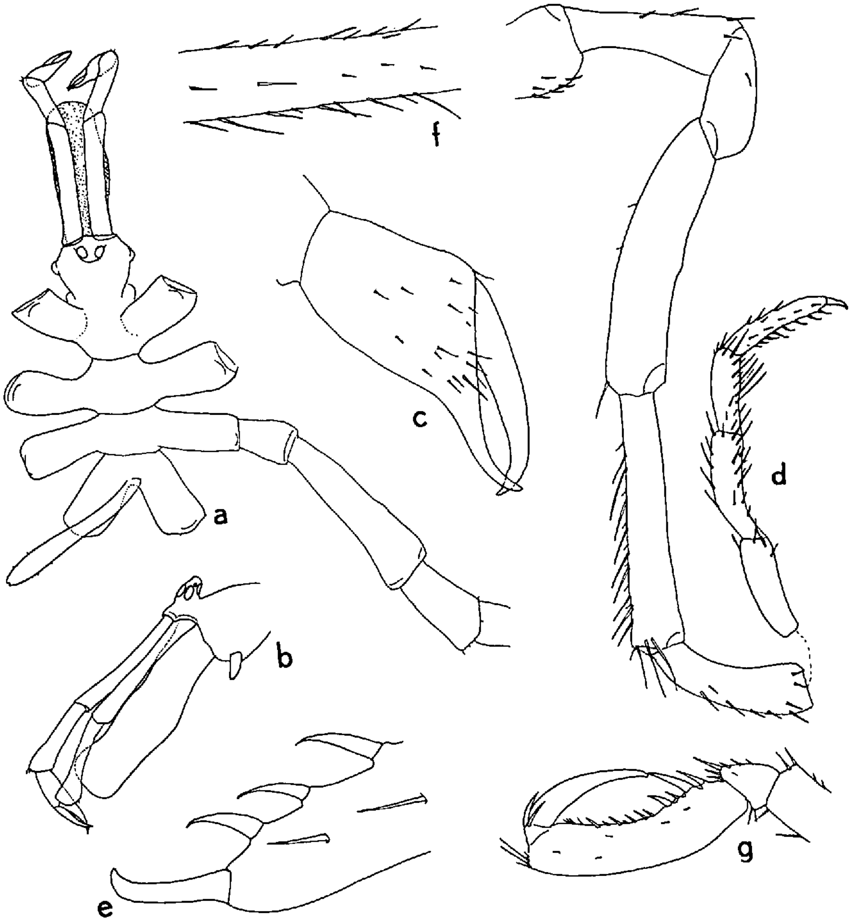

FIGURE 40. *Pallenopsis (Bathypallenopsis) guineensis* n. sp., holotype ♀. a, trunk, dorsal (scale 27); b, cephalic region, from the left (27); c, chela (23); d, oviger (22); e, tip of oviger (28); f, detail of setation of tibia 2 (free-hand sketch); g, distal segments of first leg (22). From PILLSBURY Sta. 34.

Anoplodactylus pectinis Hedgpeth, 1948
Fig. 41a

Anoplodactylus pectinis Hedgpeth, 1948: 234-236, fig. 34; Hedgpeth, 1954: 427; Stock, 1955b: 235, fig. 11; Arnaud, 1973: 955-957.

Material.—Florida: 1 ♂ ovig. Ragged Keys, Miami; 12-I-1965; L. B. Holthuis coll. (RMNH).—1 ♂. Key Largo Canal, Key Largo; on algae; 0.5 m; 30-V-1967; L. B. Holthuis coll. (RMNH).—1 ♀. Hummelinck

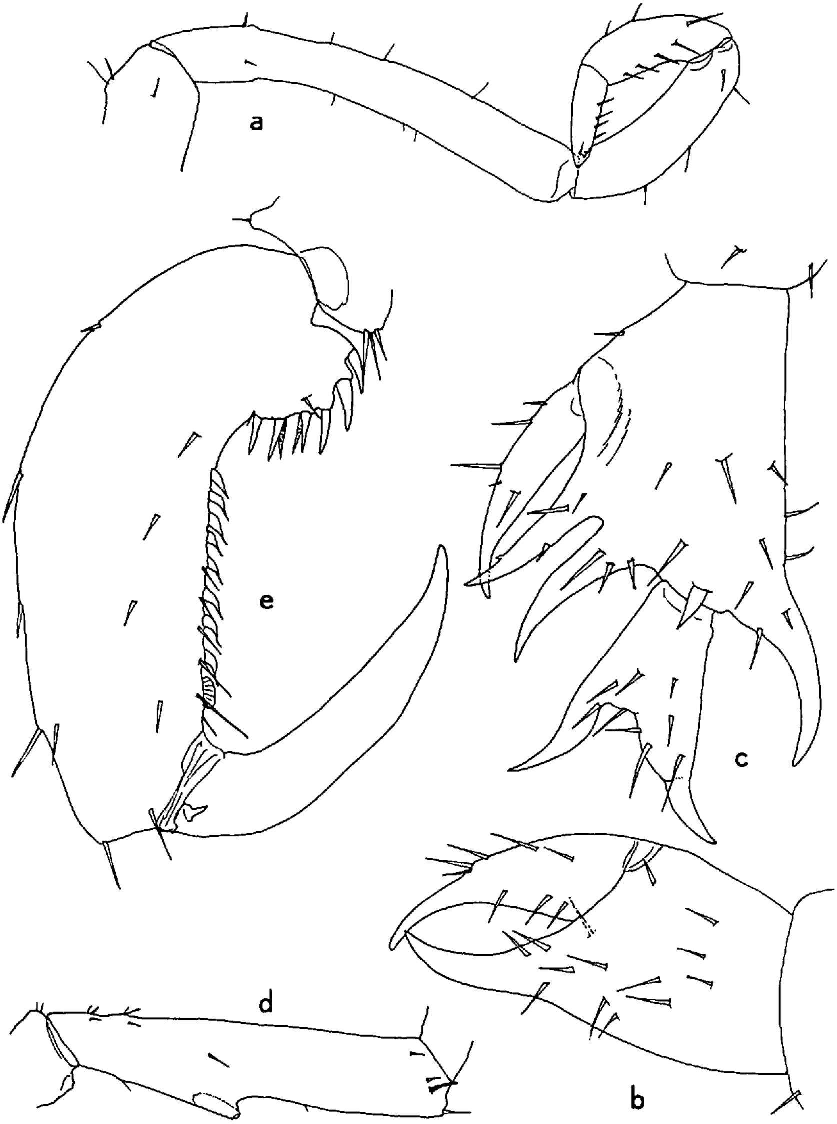

FIGURE 41. a, *Anoplodactylus pectinis* Hedgpeth, 1948: oviger, ♂ (scale 6). From Morillos, Puerto Rico. b-e, *Anoplodactylus portus* Calman, 1927. b, left chela, ♂ (scale 10); c, teratological right chela of the same ♂ (10); d, femur, ♂ (10); e, distal segments of 3rd leg, ♂ (10). From Tamarinck, Puerto Rico.

Sta. 1410: Key Biscayne, N. point; *Thalassia*; 1-IX-1963. (ZMA).—1 ♀. Hummelinck Sta. 1411: Key Biscayne, N.E. point; beach rock; 7-IX-1963. (ZMA).—1 young ♂. Hummelinck Sta. 1412: Key Biscayne, N.W. swamp; mangrove ditch; 31-VIII-1963. (ZMA).—1 ♀. Hummelinck Sta. 1414: Elliot Key; 2-6 m; 5-IX-1963. (ZMA).—Puerto Rico: 1 ♂ ovig. Morrillos; on *Sargassum* sp.; less than 5 ft.; 29-II-1969; V. A. Capriles coll. (ZMA).—Antigua: 1 ♂ ovig., 1 ♀. Hummelinck Sta. 1540A and 1540B: Dickinson Bay, North; sandy boulders; *Thalassia;* 19 and 26-VII-1967. (ZMA).—Saba Bank: 1 ♂. LUYMUS Saba Bank Exped. Sta. 42: 17°30'N 63°19'W; 19 m; sand, corals, green algae; 13-V-1972. (RMNH).

Remarks.—Hedgpeth's illustration of the ♂ oviger gives the impression that the terminal segment is unarmed. In the present material, this segment bears 5 or 6 reversed spines (Fig. 41a).

The number of spines on the propodal heel varies between 2 and 3; the distalmost of these spines is always pectinated.

Anoplodactylus portus Calman, 1927
Fig. 41b-e

Anoplodactylus portus.—Stock, 1955b: 238-239 (refs.); Stock, 1958a: 4; Stock, 1958c: 140-141; Stock, 1962a: 218; Lipkin & Safriel, 1971: 9.

Material.—Puerto Rico: about 100 specimens. Tamarinck, Guanica; on *Sargassum* sp.; depth less than 2 ft; 31-X-1968; V. A. Capriles coll. (ZMA).—Curaçao: 3 ♂, 1 ♂ ovig., 2 ♀, 8 juv. St. Michiels Bay; from hydroids on algae; abt. 1 m; 20-XI-1958; J. H. Stock coll. (ZMA).—1 ♀. St. Michiels Bay; in washings of *Lithophyllum*; 1-2 m; 20-XI-1958; J. H. Stock coll. (ZMA).—4 juv. swimming pool of Piscadera Bay Club; abt. 1 m; on hydroids; rock; 3-X-1958; J. H. Stock coll. (ZMA).—1 ♀. Hummelinck Sta. 1461A: Piscadera Bay, Boca, W.; rock pools, sandy; *Rhizophora* and *Bontia*; 14-XII-1963. (ZMA).—3 ♀, 1 ♂ ovig., 10 juv. Schottegat, outlet of Shell cooling system at Boeska Bay; 11-II-1933. (ZMA).—63 specimens. Schottegat, outlet of cooling-water in Boeska Bay; various dates in 1963; J. H. Iprenburg coll. (ZMA).—6 juv. St. Joris Bay; on hydroids from mangrove-roots; 30-XI-1958; J. H. Stock coll. (ZMA).—1 ♂, 1 ♀, 10 juv. Same loc., but 18-XI-1958. (ZMA).—Bonaire: 1 young ♂ (probably this species). Hummelinck Sta. 1375: Boca Washikemba; 7-IV-1955. (ZMA).—2 ♂, 1 ♀, 1 juv. Hummelinck Sta. 1377: Lagoen, N., coast W.; on algae; 2-IV-1955. (ZMA).—Brazil: 1 ♀. ITAMARACÁ Sta. 5: Isle of Itamaracá, 30 km N. of Recife; littoral to 5 m depth. (ZMA).

Remarks.—The large number of specimens from Puerto Rico are in preserved state green in colour, like the specimens found by Hedgpeth, 1948: 232.

In contradistinction to previous descriptions, which do not mention the presence of a propodal lamina, a very short lamina proves to be present (Fig. 41e).

One of the Puerto Rican specimens, a male, has a teratological right chela (Fig. 41c); the left chela of this individual is normally developed (Fig. 41b). Although malformations of the kind found here are quite often recorded in, for instance, decapod crustaceans, it is the first instance in Pycnogonida known to me. Helfer & Schlottke, 1935: 167 mention some malformations in seaspiders, but nothing comparable to this case.

Anoplodactylus portus is a circum-tropical species, also found in the (more temperate) eastern Mediterranean.

Anoplodactylus pharus n. sp.

Fig. 42a-e

Material.—Florida: 1 ♀ (holotype). GERDA Sta. 4: 25°49′N 79°59.5′W; 256 m; 4-V-1962. (USNM).

Description.—FEMALE (holotype): Trunk segments 1 and 2, and 2 and 3, well-articulated; segmentation line between segments 3 and 4 not distinct. Lateral processes slender, distally armed with 1 or 2 spinules; intervals between the lateral processes about twice as large as the diameter of each cruriger. Neck slender, not very long. Ocular tubercle very tall, tapering to an almost spine-like point over the rounded eyes; in front view, the lateral sense organs project like knobs. Abdomen erect, not very long.

Proboscis cylindrical, somewhat swollen in the middle, without ventral outgrowths.

Chelifore scape slender, bearing some spinules. Chela with a triangular to trapezoidal palm; fingers longer than the palm, moderately curved, armed with stiff spines.

Legs fairly spinose; tibia 1 and femur subequal, tibia 2 the shorter segment; propodus with a strong heel, armed with 1 + 2 spines; propodal sole with 8 proximal spines and a long distal lamina; auxiliary claws present and distinct.

Remarks.—Among the Caribbean and Floridan species, the present species can be confused with *A. quadratispinosus* Hedgpeth, 1943, only; with this species, it shares the long ocular tubercle. The present species has, however, a quite different armature of the propodal heel and sole.

The very tall ocular tubercle, to which the proposed specific name (*pharus* = lighthouse) alludes, separates the new species from almost every other *Anoplodactylus*, except *A. oculatus* Carpenter, 1905, from 305

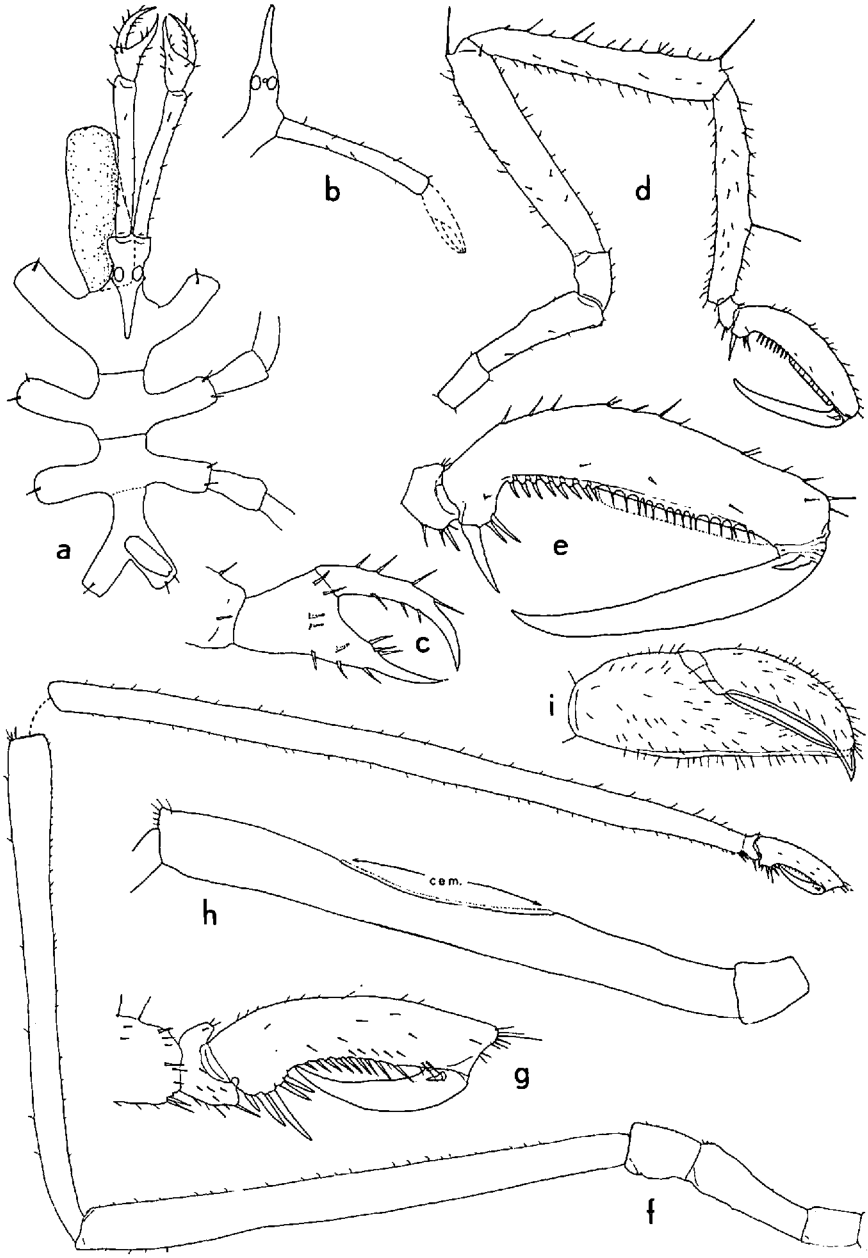

FIGURE 42. a-e, *Anoplodactylus pharus* n. sp., holotype ♀. a, trunk, dorsal (scale 23); b, ocular tubercle from the right (23); chela (28); d, third leg

fathoms off Ireland, and *A. inermis* Losina-Losinsky, 1961, from 414 m off the Kuril Islands. *A. oculatus* lacks a propodal lamina, and *A. inermis* is devoid of any armature on the propodal sole, thus both species must be considered different from the Floridan specimen.

Although only known from a single female specimen, I have endeavoured to create a new species for this very characteristic animal.

Measurements of the holotype in mm are: length trunk (frontal margin neck to tip 4th lateral process), 1.93; width across 2nd lateral processes, 1.15; length proboscis (ventral), 1.08; maximum diameter proboscis, 0.35; length ocular tubercle, 0.38; basal diameter ocular tubercle, 0.16; length scape, 0.84; and length chela, 0.40.

Measurements of the third leg in mm are: coxa 1, 0.38; coxa 2, 0.70; coxa 3, 0.30; femur, 1.38; tibia 1, 1.45; tibia 2, 1.25; tarsus, 0.10; propodus, 0.85; and claw, 0.63.

Anoplodactylus lentus Wilson, 1878
Figs. 42f-i, 43a-b

Anoplodactylus lentus.—Hedgpeth, 1948: 225 (refs.); Hedgpeth, 1954: 427; Hedgpeth, 1971: 401.

Material.—Florida and Bahamas: 1 ♀. GERDA Sta. 234: 25°42′N 79°23′W-25°44′N 79°22′W; 452-474 m; 30-I-1964. (ZMA).—1 ♂. GERDA Sta. 510: 26°07′N 79°09′W-26°10′N 79°08′W; 311-329 m; 2-III-1965. (ZMA).—1 ♀. GERDA Sta. 522: 26°05′N 78°49′W-26°09′N 78°50′W; 322-366 m; 3-III-1965. (ZMA).—1 ♂. GERDA Sta. 564: 24°33′N 83°09′W-24°32′N 83°15′W; 68 m; 12-IV-1965. (ZMA).—1 ♀. 2½ mi. SSW. of Aligator Reef Light, 150 ft.; 25-VIII-1961. (UMML).—1 ♀. 1½ mi. SW. of Aligator Reef Light; 150 ft.; 25-VIII-1961; Starck & Roper coll. (UMML).—Yucatan Channel: 1 ♀. PILLSBURY Sta. 580: 21°05′N 86°23′W; 348-357 m; 22-V-1967. (ZMA).—Saba Bank: 1 ♀. LUYMUS Saba Bank Exped. Sta. 145: 17°29′N 63°13′W; 300-350 m; soft bottom; 14-VI-1972. (RMNH).

Remarks.—Wilson's original figures (1878b, pl. 4 figs. 3a-c; 1880, pl. 3 figs. 16-18) show clearly the salient features of this species. Even in the female sex, the following features are characteristic: the chelae (with the straight immovable finger, both fingers hairy); the propodus (with a low

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←

(23); e, distal segments of 3rd leg (28). From GERDA Sta. 4. f-i, *Anoplodactylus lentus* Wilson, 1878. f, fourth leg, ♀ (scale 29); g, distal segments of 4th leg, ♀ (23); h, femur of 2nd leg, ♂, showing the cement gland (cem.) (20); i, chela, ♀ (25). ♀ from 1½ mi. S. of Aligator Light, Fla.; ♂ from GERDA Sta. 564.

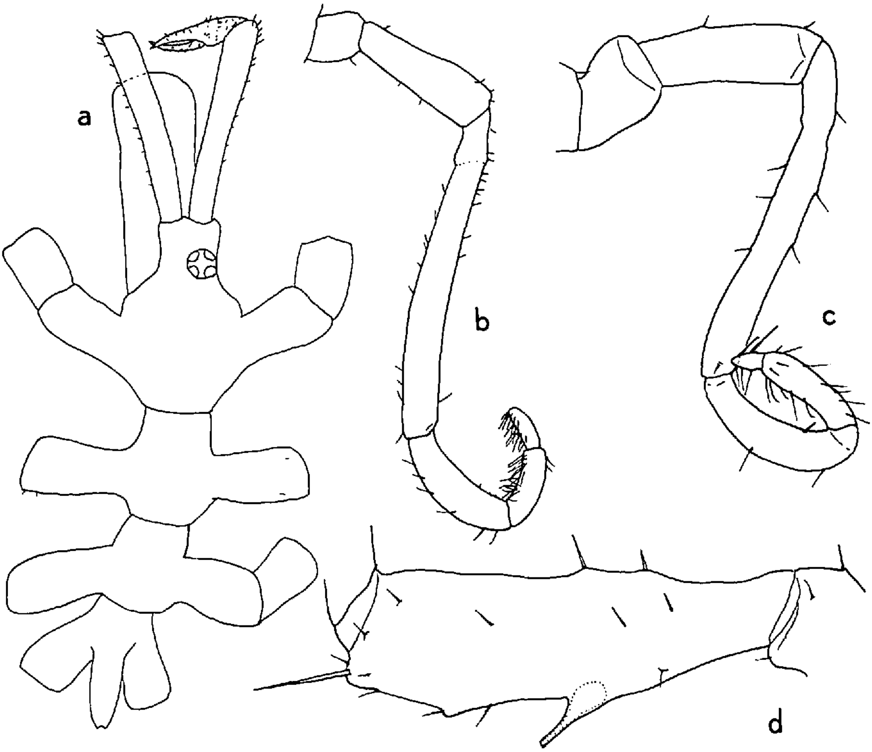

FIGURE 43. a-b, *Anoplodactylus lentus* Wilson, 1878. a, trunk, ♀, dorsal (scale 30); b, oviger, ♂ (3). ♀ from 1½ mi S. of Aligator Light, Fla.; ♂ from GERDA Sta. 564. c-d, *Anoplodactylus batangense* (Helfer, 1938), ♂. c, oviger (scale 6); d, femur (6). From Hummelinck Sta. 1410.

but distinct distal "spur"); the legs (without tubercles or prominent spines). In male, the slit-like cement gland aperture, which occupies nearly ⅓ of the length of the femur, is quite distinctive. The propodal sole is devoid of a lamina in this species; very small auxiliary claws are present.

Hedgpeth's *Anoplodactylus* sp. B (1948: 236), which has also legs "without knobs, prominent spines, or other notable features" (p. 238), is doubtless this species.

The LUYMUS specimen from the Saba Bank constitutes the southernmost record for this species.

Anoplodactylus insignis (Hoek, 1881)
Fig. 44

Anoplodactylus insignis.—Hedgpth, 1948: 226-228, fig. 28d-g (refs.); Loman, 1912, fig. E; Cerame-Vivas & Gray, 1966: 263.

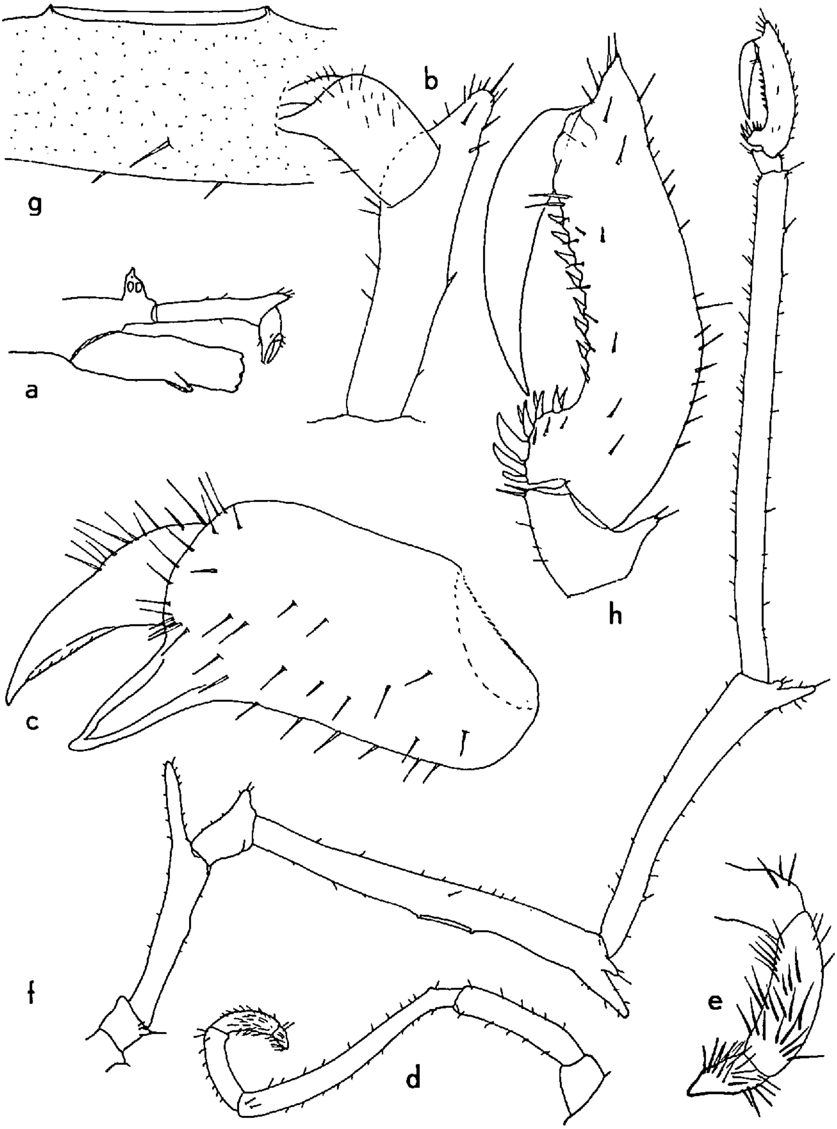

FIGURE 44. *Anoplodactylus insignis* (Hoek, 1881). a, cephalic region from the right, ♀ (free-hand sketch); b, chelifore scape, ♂ (scale 1); c, chela, ♂ (6); d, oviger, ♂ (2); e, distal portion of oviger, ♂ (12); f, fourth leg, ♂ (3); g, cement gland, ♂ (12); h, distal segments of leg 4, ♂ (12). From Joe Kemp Channel, Florida Bay.

Material.—Florida: 1 ♂. Florida Bay, Joe Kemp Channel; 15-IV-1959; Tabb & Manning coll. (UMML).—1 ♀. Same loc.; 11-XI-1958. (UMML).—1 ♀, 1 ♂. Off E. Cape Sable, Florida Bay; 11-II-1959. (ZMA).—1 ♀. Florida Bay, Conchie Channel; 11-II-1959. (UMML).—1 ♀. Cocoplum Beach; 1934; A. Ayres coll. (UMML).—1 ♀. Bear Cut near the Marine Lab., Virginia Key, Miami; eelgrass field; 15-IX-1960; L. B. Holthuis c.s. coll. (RMNH).—1 ♀. Pigeon Key; on coral; 30-I-1965; L. B. Holthuis coll. (RMNH).—1 ♀. GERDA Sta. 562: 24°32'N 83°20'W-24°32'N 83°18'W; 71 m; 12-IV-1965. (ZMA).—Trinidad: 1 ♂. Shell Exped. to the Gulf of Paria, Sta. 4005: slightly N. of Soldado Rocks, SW. of Trinidad; 8 m; coral blocks and sand; 25-IV-1952. (RMNH).—Surinam: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 51: 07°41'N 57°02'W; 98 m; calcareous sand; 30-VIII-1970. (RMNH).—1 ♀. SNELLIUS O.C.P.S. Exped. Sta. G 7: 07°16.8'N 56°47.6'W; 64 m; 13-IV-1966. (RMNH).—1 ♀. SNELLIUS O.C.P.S. Exped. Sta. B 17: 06°17.5'N 55°33.8'W; 31 m; 25-IV-1966. (RMNH).—French Guiana: 5 ♂, 2 ♂ ovig. LUYMUS O.C.P.S. Exped. II Sta. N 79: 06°13.3'N 53°49.5'W; 27 m; 9-IV-1969. (RMNH).—Brazil: 1 ♂ juv. SALDANHA Sta. 1773A: 02°28.0'N 48°13.5'W; 85 m; 14-XI-1967. (ZMA).—1 ♂. SALDANHA Sta. 1783A: 03°22.0'N 48°55.0'W; 105 m; 16-XI-1967. (ZMA).—1 ♂ ovig., 1 ♂, 1 ♀. SALDANHA Sta. 1807: 00°13.0'S 44°46.0'W; 54 m; 26-XI-1967. (ZMA).—1 ♂. SALDANHA Sta. 1889: 00°23.0'S 47°16.1'W; 31 m; 26-IV-1968. (ZMA).

Remarks.—Since three closely related species have been discovered during the present study (viz., *insigniformis* n. sp., *massiliformis* n. sp., and *simulator* n. sp.), *A. insignis* is re-illustrated in Figure 44. I have the feeling that the variability to which Hedgpeth, 1948, alludes, rests upon confusion with these new species.

A female specimen from LUYMUS Guyana Shelf Exped. Sta. 51 is remarkable in having longer processes than normal at the distal end of femur and tibia 1. Moreover the femur bears two lateral processes, slightly distad of the middle, not found in other specimens.

The species is known from Bahia (Brazil) to North Carolina (cf. Cerame-Vivas & Gray, 1966).

Anoplodactylus insigniformis n. sp.

Figs. 45-47

Material.—Canal Zone: 12 ♂ (incl. 1 ♂ holotype), several of which ovigerous, 10 ♀. PILLSBURY Sta. 323: pilings of pier 9/10, Cristobal; dip net; 6-VII-1966. (USNM).—Jamaica: 1 ♀. Hummelinck Sta. 1148: Kingston, Myrtle Bank landing; wooden and concrete piles; mud; tidal and lower zone; 15-VIII-1949. (ZMA).—Aruba: 1 ♂. Hummelinck Sta. 1302: iron beam

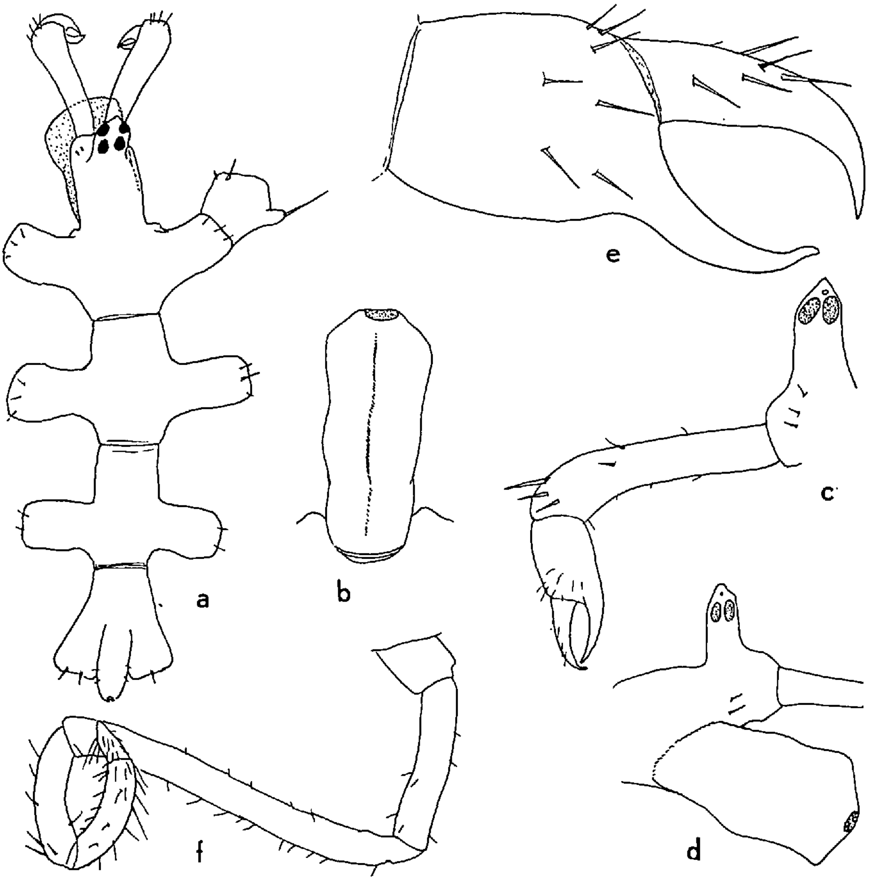

FIGURE 45. *Anoplodactylus insigniformis* n. sp. a, trunk, ♂, dorsal (scale 5); b, proboscis, ♂, ventral (1); c, ocular tubercle and chelifore, ♂, from the left (12); d, proboscis and ocular tubercle, ♀, from the right (1); e, chela, ♂ (10); f, oviger, ♂ (12). From PILLSBURY Sta. 323.

of wharf of Arend Petroleum Comp.; 4-V-1955. (ZMA).—Curaçao: 1 ♀. Mouth Piscadera Bay; among algae and sponges; 0-1 m; 19-XII-1956; L. B. Holthuis coll. (RMNH).—1 ♀. Mouth Piscadera Bay; on spines of *Eucidaris tribuloides*; abt. 1 m; XII-1956; L. B. Holthuis coll. (RMNH).—1 ♂. Swimming pool of Piscadera Bay Club; on hydroids; rock; abt. 1 m; 3-X-1958; J. H. Stock coll. (ZMA).—1 young ♂. Hummelinck Sta. 1039A: Fuik Bay, Newport Bath; sandy mud; rocks; lower zone; 20-XI-1948. (ZMA).—1 juv., probably this species. Hummelinck Sta. 1465: Piscadera Bay, near entrance, E.; 0.5 m; *Rhizophora*; 11-XII-1963.

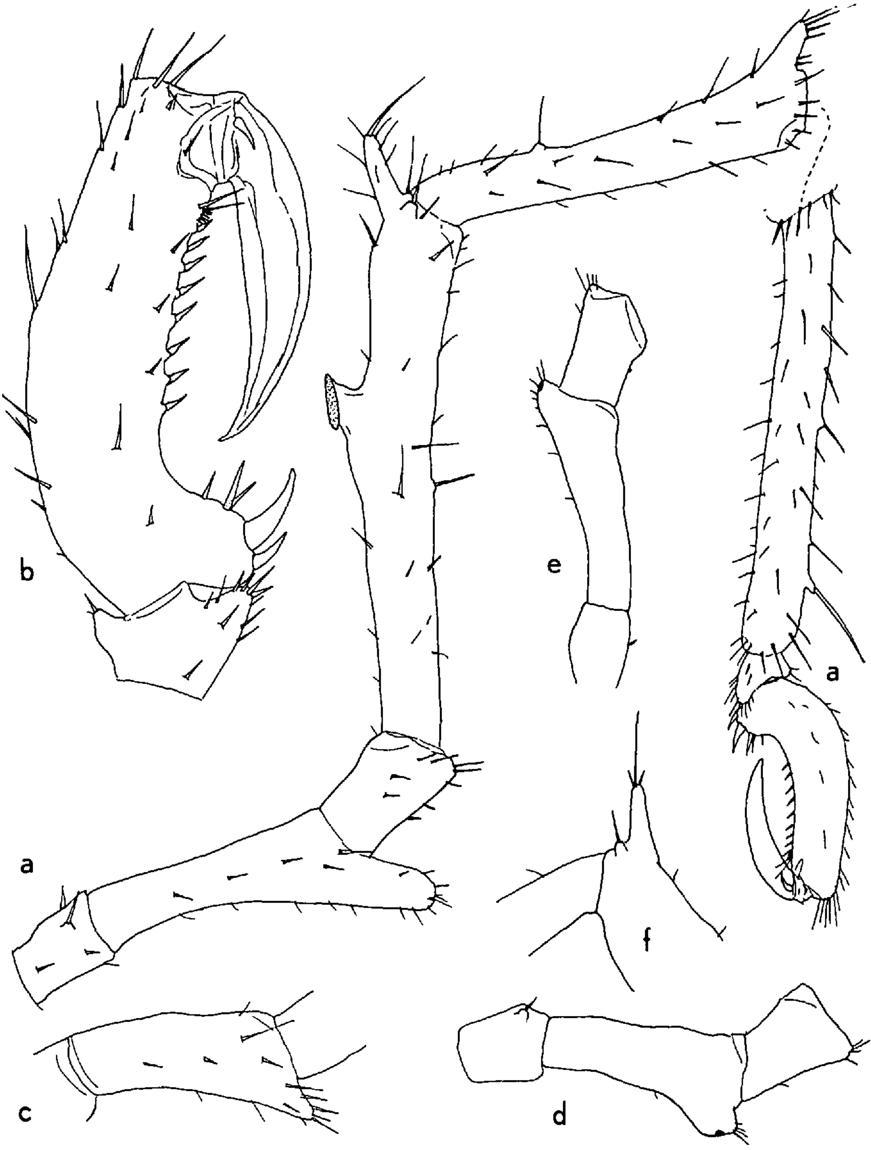

FIGURE 46. *Anoplodactylus insigniformis* n. sp. a, fourth leg, ♂ (scale 1); b, distal segments of 4th leg, ♂ (6); c, coxa 2 of leg 1, ♂ (1); d, coxae of leg 1, ♀ (1); e, coxae of leg 4, ♀ (1); f, distal end of femur, ♀ (1). From PILLSBURY Sta. 323.

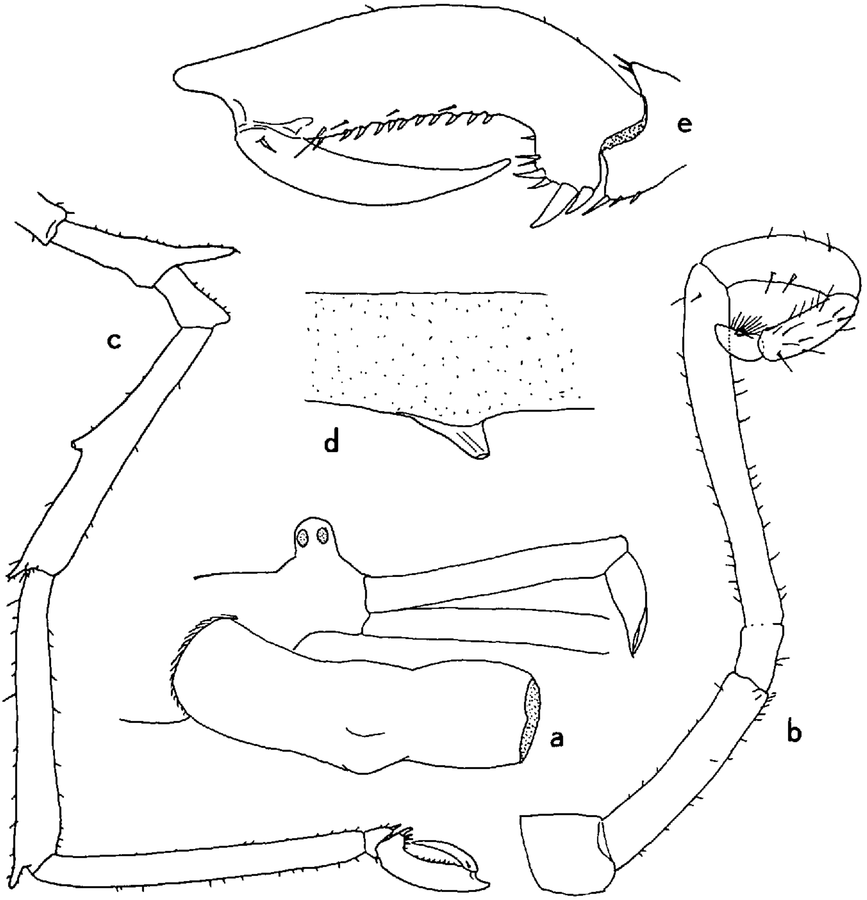

FIGURE 47. *Anoplodactylus polignaci* Bouvier, 1914. a, cephalic region, ♀, from the right (freehand sketch); b, oviger, ♂ (scale 1); c, fourth leg, ♂ (3); d, cement gland, ♂ (1); e, distal segments of 4th leg, ♂ (12). From ATLANTIDE Sta. 145.

(ZMA).—1 ♂, 3 ♀. Hummelinck Sta. 1468 and 1469: Piscadera Bay, S.E. part; rocky; *Rhizophora*; 18-XII-1963. (ZMA).—1 ♂, 2 juv. Hummelinck Sta. 1473: Piscadera Bay, central part, S.W.; *Rhizophora*; 13-XII-1963. (ZMA).—64 specimens, incl. ovig. ♂. Hummelinck Sta. 1477: Piscadera Bay, central part, 3rd buoy; 31-X-1963. (ZMA).—1 ♂ ovig. Hummelinck Sta. 1484: Piscadera Bay, N., 1st buoy; 2-XI-1963. (ZMA).—2 ♂, 2 ♀, 7 juv. Hummelinck Sta. 1491a. Piscadera Bay, N.; islet; *Rhizophora*; 26-IX-1962; Miss L. J. van der Steen coll. (ZMA).—Bonaire: 1 ♂. Paloe Lechi; abt. 2 m; 24-XII-1958; J. H. Stock coll. (ZMA).

Description.—Trunk completely segmented. Neck rather long and narrow. Lateral processes separated by intervals twice as wide as their own diameter. Each lateral process armed with (1, 2, or) 3 distal spinules. Abdomen hardly longer than 4th lateral process.

Ocular tubercle tall (about twice as long as wide), conically pointed over the eyes; eyes well-pigmented, oval; lateral sense organs present.

Proboscis more or less cylindrical in ventral view; somewhat barrel-shaped in lateral view; in ♀ without ventral outgrowths.

Chelifore scape without distal spur, with some distal spines only. Chela with curved, unarmed fingers that are slightly shorter than the palm.

Oviger segment 2 less than half as long as segment 3; segments 4 and 5 subequal; segments 5 and 6 with numerous reversed setules. The eggs on the ♂ oviger are very small (diameter 33-36 microns) and numerous.

Legs slender, armed with numerous short spines. Coxa 1 without dorsal spurs, with 2 dorsal spines, which are stronger in ♂ than in ♀. Coxa 2 very elongate, especially in P4, with a strong genital spur on P3 and P4 of the male, and a shorter spur on P1 ♂, P2 ♂, and P1-P4 ♀. Femur, in both sexes, with long distal spur, accompanied by 2 lower, spiniferous tubercles. Femoral cement gland opening through a broadly chimney-shaped tube, distally with a wider rim. Distal spur of tibia 1 shorter than that on the femur. Propodus gently curved, without distal spur; heel with 2 larger spines; sole with about 8 spinules, without lamina; claw strong; auxiliary claws present.

Remarks.—In the Caribbean and adjacent regions, three species with a long femoral spur (as in the present material) have been recorded (Hedgpeth, 1948): *A. massiliensis* Bouvier, 1916; *A. polignaci* Bouvier, 1914, and *A. insignis* (Hoek, 1881). Moreover, 2 new species with distal femoral spur are recorded in the sequel (*massiliformis* and *simulator*).

The present material differs from *massiliensis* chiefly in the quite different shape of the chelae (for the chela of *massiliensis*, see Stock, 1967, fig. 3b) and in the absence of a strong distal spur on the propodus.

The present material differs from *polignaci* in the absence of a distal spur on the propodus, in the length of the 2nd oviger segment (less than half as long as the 3rd in the new species, versus more than half as long in *polignaci*), in a different cement gland (chimney-shaped versus conical), and in a shorter proboscis. Some new figures, showing the salient characters of *polignaci*, are incorporated in the present paper (Fig. 47).

From *A. insignis*, which is said to be a variable species (Hedgpeth, 1948: 228), the present material differs in the absence of a distal spur on the chelifore scape, in a quite different cement gland, in the presence of auxiliary claws, in the absence of ventral outgrowths on the ♀ proboscis, in a shorter and more robust coxal spur in male, in a quite different chela, etc. (new figures of *A. insignis* in this paper, Fig. 44).

Measurements of ♂ from PILLSBURY Sta. 323 in mm are: length trunk (frontal margin neck to tip of abdomen), 2.95; width across 2nd lateral processes, 1.20; length scape, 0.68; length proboscis (ventral), 1.00; and maximum diameter proboscis (ventral), 0.41.

Measurements of first leg in mm are: coxa 1, 0.29; coxa 2, 0.72; coxa 3, 0.40; femur, 1.94; tibia 1, 1.84; tibia 2, 1.98; tarsus, 0.11; propodus, 0.76; and claw, 0.47.

Anoplodactylus massiliformis n. sp.

Figs. 48-49

Material.—Brazil: 1 ♂ (holotype). SALDANHA Sta. 1773A: off the mouths of the Amazon, 02°28.0′N 48°13.5′W; 85 m; 14-XI-1967. (ZMA)—Canal Zone: 1 ♀ (allotype). PILLSBURY Sta. 430: off Colon, 09°31.0′N 79°51.0′W-09°30.5′N 79°52.5′W; 63-60 m; 20-VII-1966. (USNM).—Barbados: 1 ♀. Hummelinck Sta. 1442: ½ mi. off Holetown; 100 m; muddy sand, shell debris, sponge bottom; 19-II-1964. (ZMA).—Magarita: 1 ♂ ovig. Hummelinck Sta. 1449: Puente de La Restinga; boulders near *Rhizophora*; 11-I-1964. (ZMA).—Guyana: 1 ♂, 2 ♀. LUYMUS Guyana Shelf Exped. Sta. 103: 07°54′N 57°31′W; 85 m; muddy sand, gravel; 4-IX-1970. (RMNH).—French Guiana: 1 ♂. LUYMUS Guyana Shelf Exped. Sta. 14: 06°44′N 52°45′W; 76 m; muddy calcareous sand; 26-VIII-1970. (RMNH).

Description.—LARGE FEMALE (allotype): Trunk completely segmented, very slender. Lateral processes separated by twice their own diameter. Each lateral process armed with 1, 2, or 3 minute spinules only. Neck not very long, unarmed. Abdomen very long.

Ocular tubercle cylindrical in its basal part, conical and somewhat swollen distally. Eyes well pigmented.

Proboscis cylindrical, without ventral outgrowths.

Scape slender, without distal spur. Chela elongate; palm much shorter than the fingers; fingers gently curved, provided with some setae, but inner margin unarmed.

Legs slender. Distal spurs (1 long and 2 short) on femur and tibia 1. Tibiae 1 and 2 moreover with several knob-like to finger-shaped spiniferous projections. Propodus with strong heel, armed with 4 unpaired spines; propodal sole straight, armed with some 13 spinules; claw long, nearly straight; auxiliary claws rudimentary but present.

MALE (holotype). Smaller than the female, but apparently mature. Very similar to the female, processes on tibia 2 slightly lower. Propodus with 2 strong basal teeth and 4 smaller ones on the heel. The cement gland is similar to that found in *A. insigniformis* n. sp., but is arises more proximally. The genital spur, on coxa 2 of legs 3 and 4, is very tall. The oviger has a

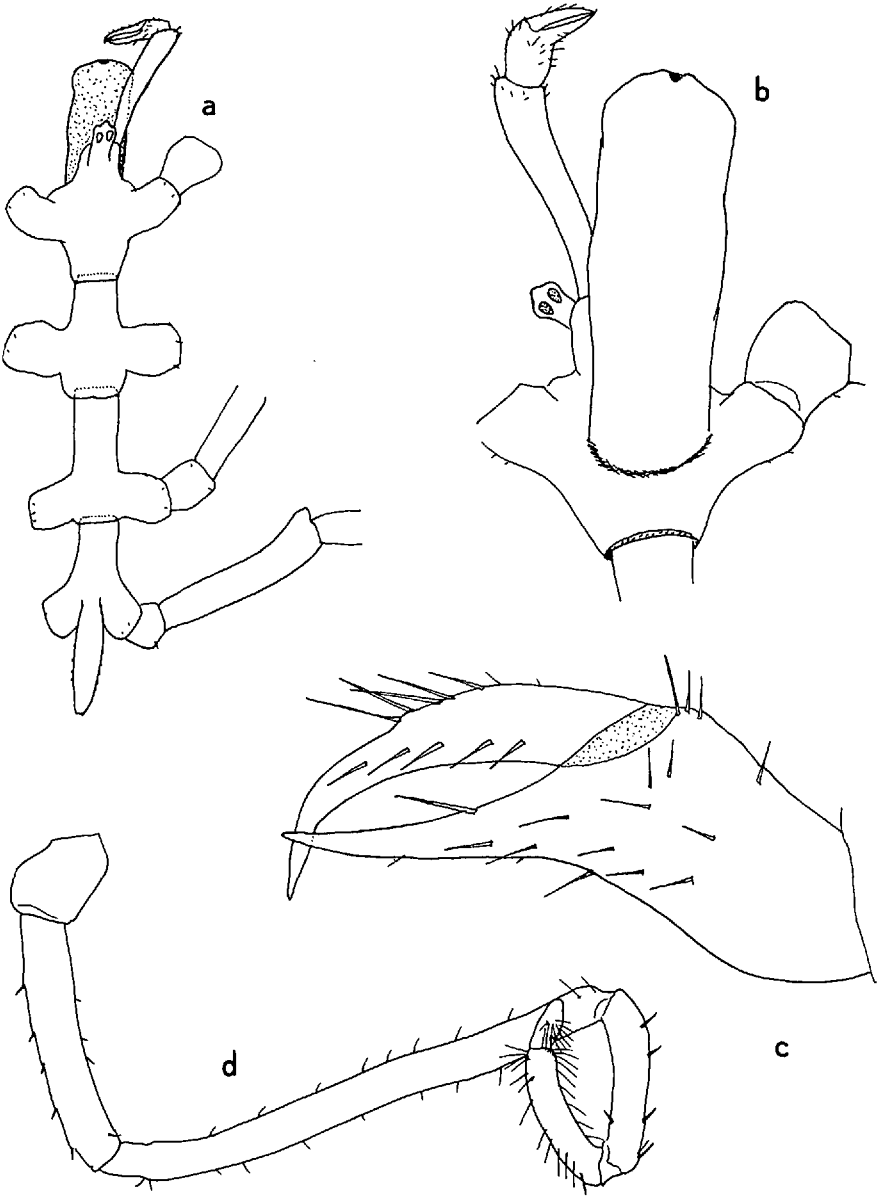

FIGURE 48. *Anoplodactylus massiliformis* n. sp. a, trunk, ♀, dorsal (scale 16); b, cephalic segment. ♀, ventral (5); c, chela, ♀ (6); d, oviger, ♂ (12). ♀ from PILLSBURY Sta. 430, ♂ from SALDANHA Sta. 1773A.

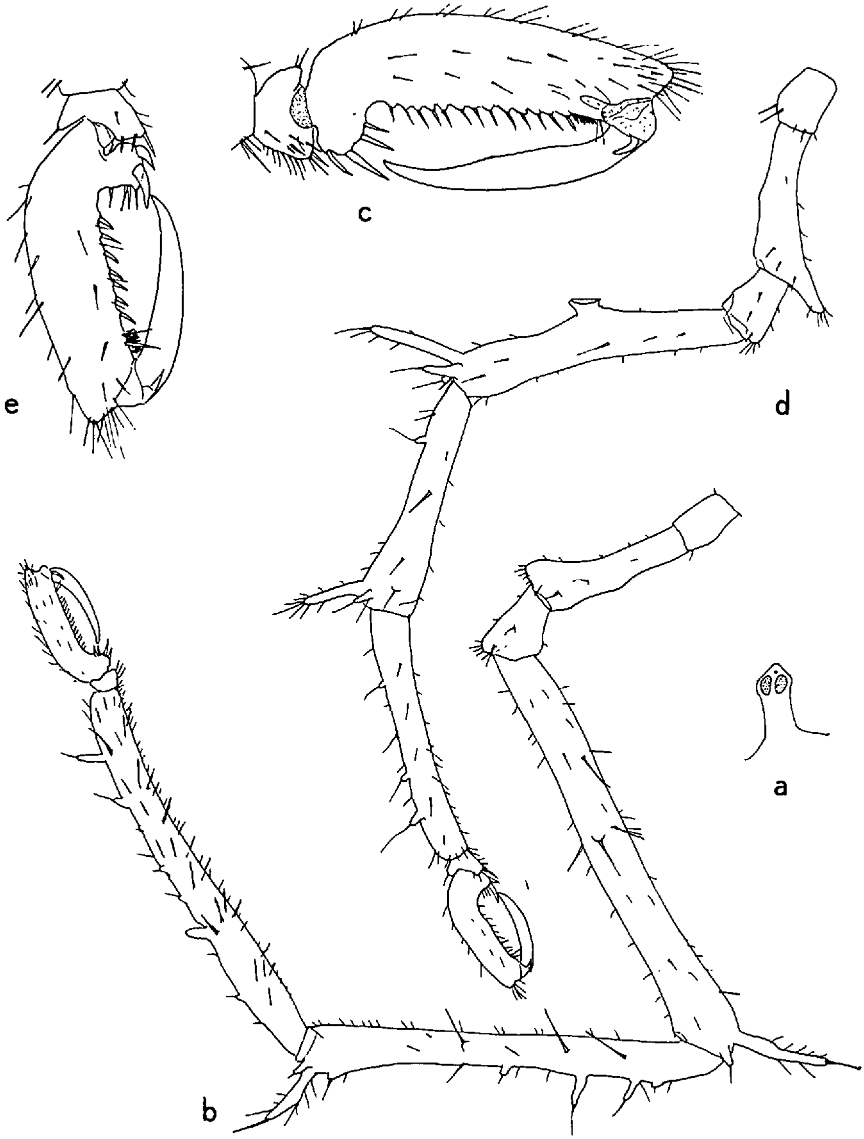

FIGURE 49. *Anoplodactylus massiliformis* n. sp. a, ocular tubercle, ♀, from the left (free-hand sketch); b, second leg, ♀ (scale 3); c, distal segments of 2nd leg, ♀ (1); d, third leg, ♂ (2); e, distal segments of 3rd leg, ♂ (12). ♀ from PILLSBURY Sta. 430, ♂ from SALDANHA Sta. 1773A.

very elongated 3rd segment; the distal segment is armed with a patch of setae in the middle of the article.

Remarks.—The present species is undoubtedly close to *A. massiliensis* Bouvier, 1916, as will be clear especially from the elongated shape of the chela. Differences are found in the absence of a distal spur on the propodus, in the presence of spiniferous projections all over the tibiae, and in the much longer abdomen.

On the other hand, the structure of the legs (and especially of the cement gland) is rather similar to that found in *A. insigniformis* n. sp. From that species, it differs in the distinctly more slender chela, in the taller and more numerous processes on the legs, in the longer abdomen, etc.

Measurements, in mm, of the ♂ holotype (and, in parentheses, of the ♀ paratype) are: length trunk segment 1, 1.00 (1.44); length trunk segment 2, 0.58 (1.00); length trunk segment 3, 0.78 (1.33); length trunk segment 4, 0.80 (1.26); length abdomen, 0.63 (1.26); width across 2nd lateral processes, 1.18 (1.41); diameter trunk segment 2 (without crurigers), 0.30 (0.37); length proboscis (ventral), 1.23 (1.89); diameter proboscis, near the tip, 0.48 (0.67); length scape, 0.58 (1.15); length chela, 0.53 (0.59).

Measurements, in mm, of the articles of leg 3, ♂ holotype (and, in parentheses of leg 3, ♀ allotype) are: coxa 1, 0.38 (0.56); coxa 2, 1.10 (1.59); coxa 3, 0.45 (0.74); femur, 1.93 (4.59); tibia 1, 1.70 (4.11); tibia 2, 1.83 (4.37); tarsus, 0.10 (0.22); propodus, 0.83 (1.22); claw, 0.58 (0.96).

Anoplodactylus simulator n. sp.

Fig. 50

Material.—Florida: 1 ♂ (holotype). GERDA Sta. 360: 24°24′N 81°26′ W-24°25′N 81°25′W; 176 m; 15-IX-1964. (USNM).

Description.—Lateral processes widely separated. No articulation between trunk segments 3 and 4. Neck narrow, moderately long. Ocular tubercle tall, highly conical, pointed; eyes present. Abdomen shorter than 4th lateral process, erect. On each lateral process a conical, spinulated tubercle.

Proboscis cylindrical, slightly swollen proximally of the middle.

Chelifore scape long and slender, distally with a well-developed dorsal projection. Chela with slender palm; fingers curved; the movable finger heavier than the immovable one; both fingers setose.

Palp present as a knob-like rudiment, on the anterior margin of the first lateral process, visible in both dorsal and ventral view.

Oviger implanted on the ventral side of the first lateral process (implantation visible in ventral view only). Second segment ⅚ as long as segment

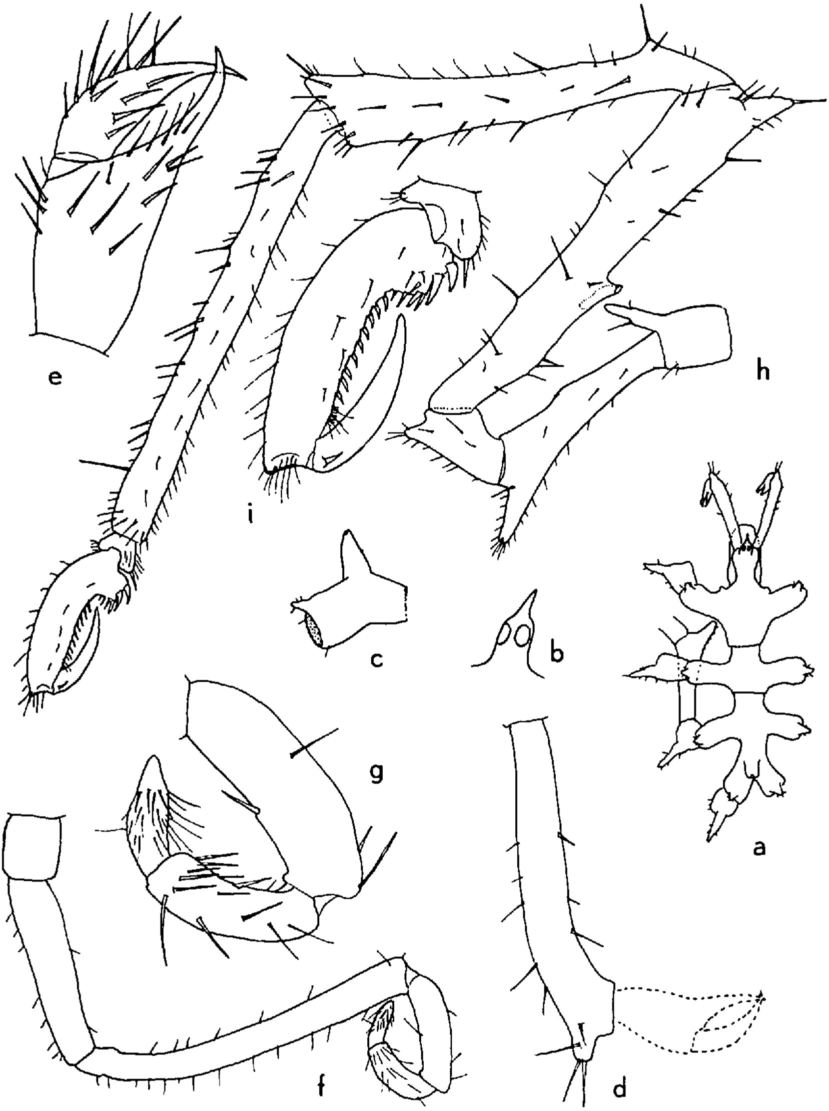

FIGURE 50. *Anoplodactylus simulator* n. sp., holotype ♂. a, trunk, dorsal scale (3); b, ocular tubercle, from the right (free-hand sketch); c, fourth trunk segment from the right (free-hand sketch); d, chelifore (12); e, chela (6); f, oviger (1); g, distal portion of oviger (6); h, third leg (5); i, distal segments of 3rd leg (12). From GERDA Sta. 360.

3. Segment 4 not very elongated; segment 5 much shorter than 4, not slender; segments 5 and 6 setiferous; segment 6 with conical, unarmed, distal portion.

Legs slender. A very tall distodorsal process on coxa 1. A tall, tapering, ventrodistal spur on coxa 2 of legs 3 and 4; a similar process, but less tall, on coxa 2 of legs 1 and 2. Coxa 3 with low distoventral spur. Femur with 1 tall distodorsal spur, accompanied by 2 low knob-like processes. Femoral cement gland opening at the tip of a triangular dorsal swelling of the segment, through a small, rounded pore. Tibia 2 the longer segment. Tibia 1 with inconspicuous distal spur. All longer leg segments armed with spine-like setae. Propodal heel with 2 stronger and 4 to 5 feebler spines; sole straight, with 9 spines, and distally with 2 or 3 setae and a minute lamina. Auxiliary claws rudimentary but present.

Remarks.—This is another member of the *insignis-massiliensis*-complex. It agrees with *Anoplodactylus insignis* in the presence of dorsal spurs on the first coxa and the femur, and in the scape of the chelifore; but it differs from *insignis* in the pore-like (and not slit-like) femoral cement gland aperture, and in the shape of the chelae.

It agrees with *A. polignaci* in the spurs on the long leg segments, and in the shape of the cement gland aperture, but it differs from that species in the presence of a long spur on coxa 1 and a short one on the lateral processes, while there is no spur on the propodus. Hedgpeth, 1948, fig. 30b, illustrates the oviger of *polignaci* with a slender 5th segment, but in material from West Africa (ATLANTIDE Sta. 145), the 5th oviger segment is less slender (cf. Fig. 47b).

A. massiliformis has longer spurs on the femur and tibia, but no spur on the first coxa; moreover its chela is much more slender, and the 5th oviger segment is more elongate.

A. insigniformis is rather similar to the present species, but lacks protuberances on the lateral processes, on the chelifore scape, and on the first coxa; moreover, the 5th oviger segment of *insigniformis* is more elongate, and the cement gland aperture is different.

Derivatio nominis.—The proposed specific name alludes to the morphological similarity within this complex of sibling species.

Measurements of the holotype (♂) in mm are: length trunk segment 1, 1.10; length trunk segment 2, 0.63; length trunk segments 3 + 4 (to tip 4th lateral process), 1.30; length proboscis (ventral), 1.40; greatest diameter proboscis, 0.38; and width across 2nd lateral processes, 1.43.

Measurements of the third leg in mm are: coxa 1, 0.36; coxa 2, 1.08; coxa 3, 0.40; femur, 2.23; tibia 1, 2.16; tibia 2, 2.45; tarsus, 0.11; propodus, 0.90; and claw, 0.50.

Anoplodactylus iuleus n. sp.

Figs. 51-52

"? *Anoplodactylus maritimus* Hodgson".—Hedgpeth, 1948: 230, fig. 29d-e.

Material.—Florida: 1 ♂ (holotype). GERDA Sta. 650: 26°37′N 79°45′ W-26°41′N 79°45′W; 476-452 m; 16-VII-1965. (USNM).

Description.—Trunk completely segmented. Lateral processes slender, separated by about twice their own diameter, distally armed with a minute dorsal setule. Neck long, slender. Abdomen short, erect.

Ocular tubercle low, more or less truncated in front view, with a slight medial notch; rounded in lateral view; eyes well pigmented.

Proboscis slender, almost cylindrical, rounded at the tip.

Chelifore scape elongate. Chela with a trapezoidal palm; fingers much longer than the palm, curved, armed with rows of strong setae.

No palps.

Oviger with a long 2nd, and a very long 3rd segment; 4th segment slightly curved, elongated; segments 5 and 6 together only 60 per cent of the length of segment 4; segment 5 with 3 robust ventral spines and several reversed setae; a similar group of reversed setae is present on segment 6.

Legs slender. Genital spur on coxa 2 low. Cement gland duct short, placed on a swelling slightly proximad of the middle of the femur. Tibiae with numerous spine-like setae, that are slightly longer than the diameter of the segment. Propodus with very clearly demarcated heel bearing 1 longer and 2 shorter spines; sole with about 18 spinules and a short but distinct lamina. Claw slender, as long as the sole; auxiliary claws present but small.

Measurements of the holotype in mm are: length cephalic segment, 1.10; length trunk segment 2, 0.50; length trunk segment 3, 0.53; length trunk segment 4 (to tip 4th lateral process), 0.80; width across 2nd lateral processes, 1.63; diameter 2nd lateral process, 0.25; distal interval between 2nd and 3rd lateral process, 0.45; length proboscis, 1.50; greatest diameter proboscis, 0.40; distal diameter proboscis, 0.33; length scape, 1.10; and length chela, 0.70.

Measurements of the fourth leg in mm are: coxa 1, 0.43; coxa 2, 1.23; coxa 3, 0.38; femur, 2.35; tibia 1, 2.38; tibia 2, 2.38; tarsus, 0.11; propodus, 1.05; and claw, 0.83.

Remarks.—This species is no doubt identical with the single female from off Habana, Cuba, recorded by Hedgpeth, 1948, with considerable doubt as "? *Anoplodactylus maritimus* Hodgson".

I do not agree with Hedgpeth's tentative identification of his Caribbean material with Hodgson's material found on floating *Sargassum* South of the Azores. Hodgson's description, vague as it may be, gives no indication of

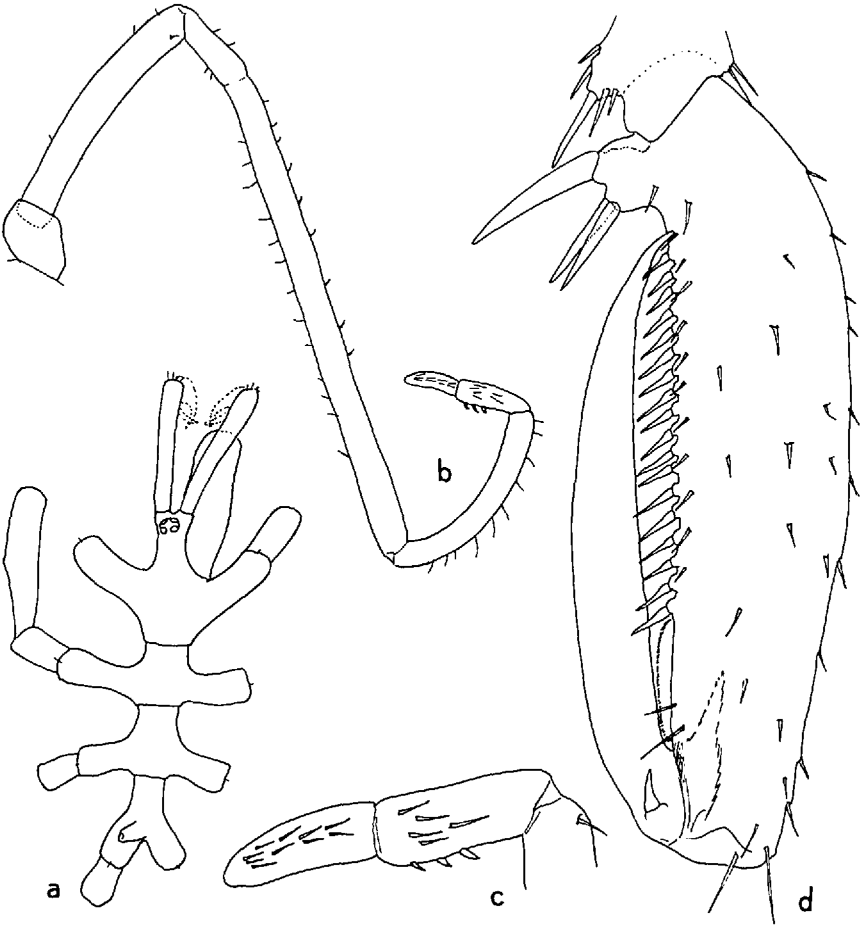

FIGURE 51. *Anoplodactylus iuleus* n. sp., holotype ♂. a, trunk, dorsal (scale 2); b, oviger (17); c, distal portion of oviger (6); d, distal segments of 4th leg (6). From GERDA Sta. 650.

such an identity. On the contrary, Hodgson (1927) gives the length of the trunk as "wenig mehr als 1 mm" (versus 2.93 mm in the present material); the length of the legs is "etwa 3 mm" in *A. maritimus* (versus 11.1 mm in the present material); the lateral processes in *maritimus* are "kaum weit getrennt" (which means, according to Hodgson, 1927: 307, that the distance between the crurigers is hardly more than the diameter of the cruriger), whereas in the present material this distance is nearly twice the diameter of the cruriger; according to Hodgson, the "zweite Coxa ist nicht so

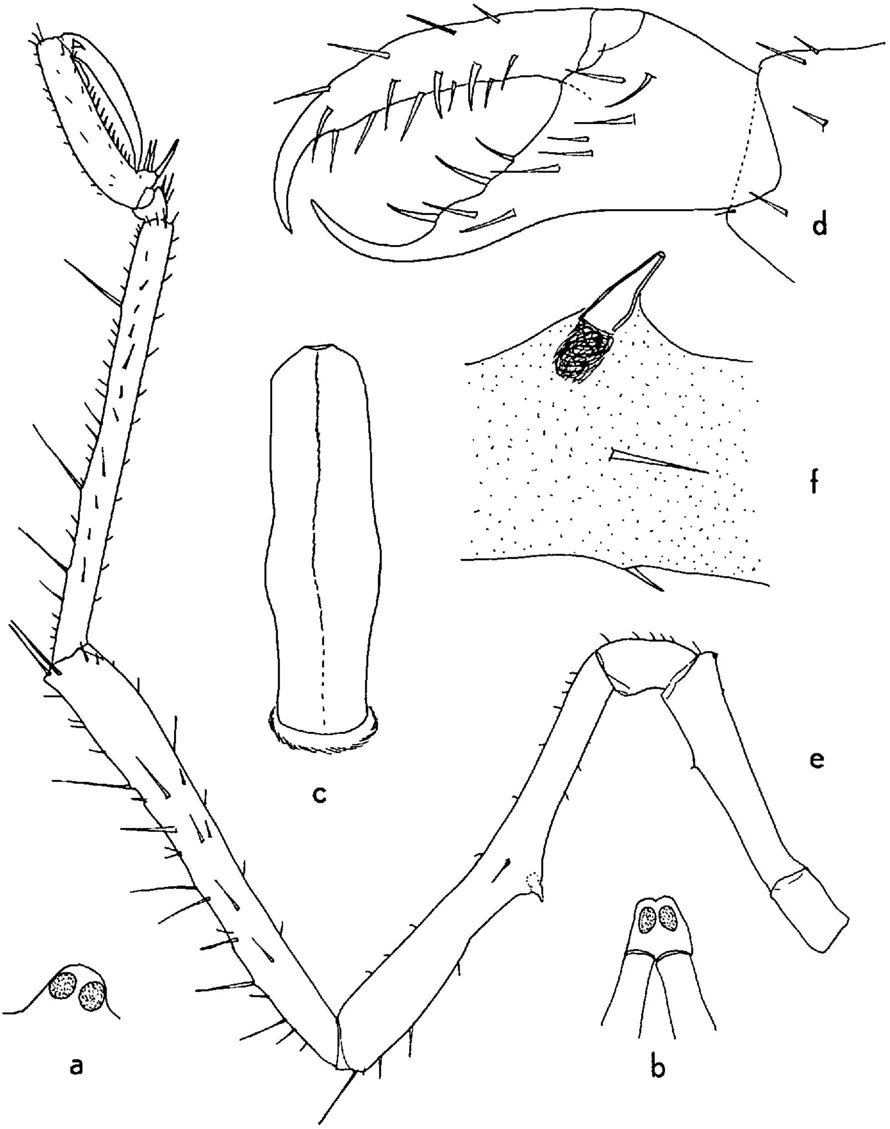

FIGURE 52. *Anoplodactylus iuleus* n. sp., holotype ♂. a, ocular tubercle from the right (free-hand sketch); b, ocular tubercle, frontal (free-hand sketch); c, proboscis, ventral (scale 1); d, chela (6); e, fourth leg (5); f, cement gland on leg 4 (6). From GERDA Sta. 650.

lang wie den beiden anderen Coxen zusammen" (versus 1½ times as long as coxa 1 + 3 in the present material); the auxiliaries in *A. maritimus* are said to be lacking (versus present in our material); the fingers of the chela are unarmed in *A. maritimus* (versus setose in the present material).

In all these characters, *A. maritimus* Hodgson, 1914, agrees perfectly with *A. parvus* Giltay, 1934. Since *A. parvus* is, moreover, the most common pycnogonid on floating *Sargassum* (see Stock, 1954a, and Bourdillon, 1955), and since *A. maritimus* was recorded on floating *Sargassum* by Hodgson (1927: 357), I have little doubt that both species are synonymous.

I have tried to locate Hodgson's type material of *Anoplodactylus maritimus*, but neither in the Zoological Museum of the Humboldt University, Berlin, nor in the Zoological Institute and Museum, Hamburg, nor in the British Museum (Natural History), London, the material is present. Hence, the identity of Hodgson's species could not be made absolutely certain, but at any rate it is not identical with the present species, as I have shown above.

A. iuleus n. sp. is closely related to *A. pelagicus* Flynn, 1929, as Hedgpeth stressed already. It differs, however, from *pelagicus* (see the new illustrations of the latter species in Barnard, 1954: 128, fig. 19) in the chela which has much longer fingers in *pelagicus* and in the absence of a propodal lamina in *pelagicus*.

Derivatio nominis.—In honour of Dr. Joel W. Hedgpeth, who was the first to record this species, the name *iuleus* (adj. of Ἴουλος) is proposed.

Anoplodactylus petiolatus (Krøyer, 1844)

Fig. 53

Material.—Bahamas: 1 ♂. TURSIOPS Sta. 107: 25°38'N 79°21'W (= off Cat Cay, 1⅓-1¼ mi. offshore); 130 fms.; 4-V-1965. (UMML).—Curaçao: numerous specimens from Piscadera Bay, 0-5 m, chiefly from sandy bottom or from muddy sand; Hummelinck Stations 1467B, 1467C, 1469A, 1471A, 1471B, 1473A, 1474B, 1475A, 1479, 1479A, 1480, 1480A, 1486. (ZMA).—Bonaire: 1 ♀. Hummelinck Sta. 1056Aa: Paloe Lechi, S. of Salinja; rocky beach, pools; mid-tide zone; 24-II-1949. (ZMA).—Venezuela: 1 ♀, 2 juv. Hummelinck Sta. 1215: La Pecha (Los Frailes); rock debris, sand; 1-2 m; 19-VI-1936. (ZMA).—Guyana: 1 ♂ ovig. LUYMUS Guyana Shelf Exped. Sta. A 116: 06°53'N 57°49.2'W; 15.2 m; 7-IX-1970. (RMNH).—4 ♂ (partly ovig.), 5 ♀, 15 juv. LUYMUS Guyana Shelf Exped. Sta. 112: 07°24'N 57°36'W; 39 m; muddy sand; 5-IX-1970. (RMNH).—5 ♂, 4 ♀, 1 juv. LUYMUS Guyana Shelf Exped. Sta. 76: 06°41'N 57°18'W; 23 m; sandy mud; 1-IX-1970.—3 ♂, 5 ♀, 14 juv. LUYMUS Guyana Shelf Exped. Sta. 74: 06°46'N 57°16'W; 27.5 m; muddy sand; 31-VIII-1970. (RMNH).—Surinam: 1 ♂, 1 larva. LUYMUS O.C.P.S. Exped. II

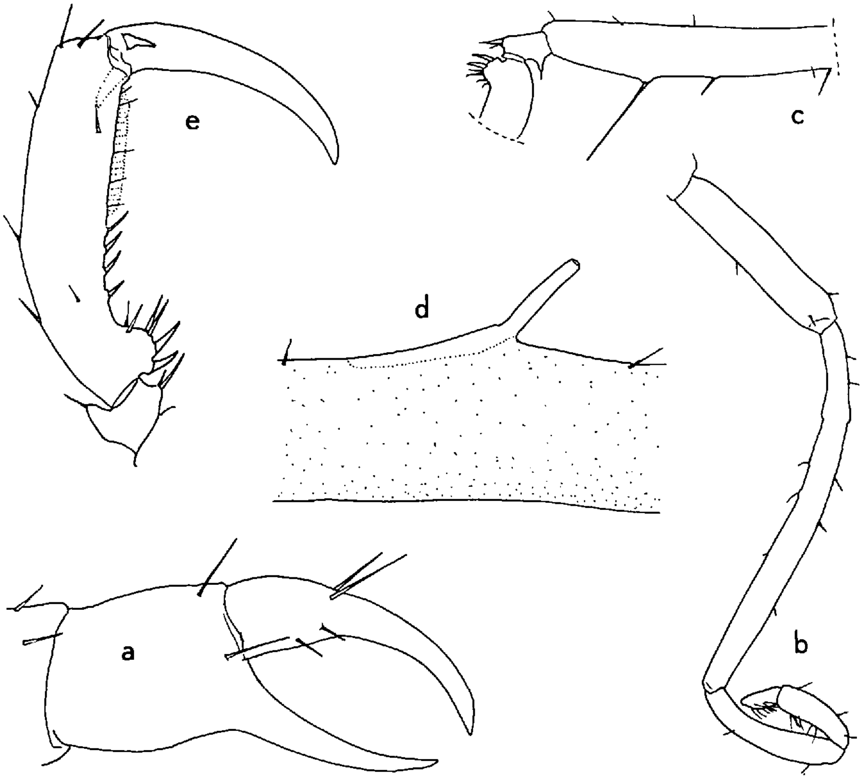

FIGURE 53. *Anoplodactylus petiolatus* (Krøyer, 1844), ♂. a, chela (scale 11); b, oviger (9); c, distal end of tibia 2 (9); d, cement gland (10); e, distal segments of 3rd leg (10). From TURSIOPS Sta. 107.

Sta. J 111: 06°52.8′N 54°41.1′W; 52 m; 22-IV-1969. (RMNH).—1 ♂. LUYMUS O.C.P.S. Exped. II Sta. L 90: 06°48.0′N 54°11.4′W; 45 m; 12-IV-1969. (RMNH).—2 ♂, 4 ♀. LUYMUS O.C.P.S. Exped. II, Station unknown, 1969 (eastern part of coast of Surinam, approx. between 54° and 56° W, 0-100 m). (RMNH).—French Guiana: 1 ♀. LUYMUS Guyana Shelf Exped. Sta. 16: 06°18′N 52°57′W; 56 m; muddy calcareous sand; 26-VIII-1970. (RMNH).—1 ♂. LUYMUS Guyana Shelf Exped. Sta. 15: 06°36′N 52°50′W; 72 m; calcareous sand; 26-VIII-1970. (RMNH).

Remarks.—In order to clarify the distinction between *Anoplodactylus petiolatus* and *A. maritimus* Hodgson, 1914 (= *A. parvus* Giltay, 1934, see discussion under *A. iuleus* n. sp.), of which Hedgpeth, 1948: 223 considers the possibility that they "may prove to be the same", I have inserted in this

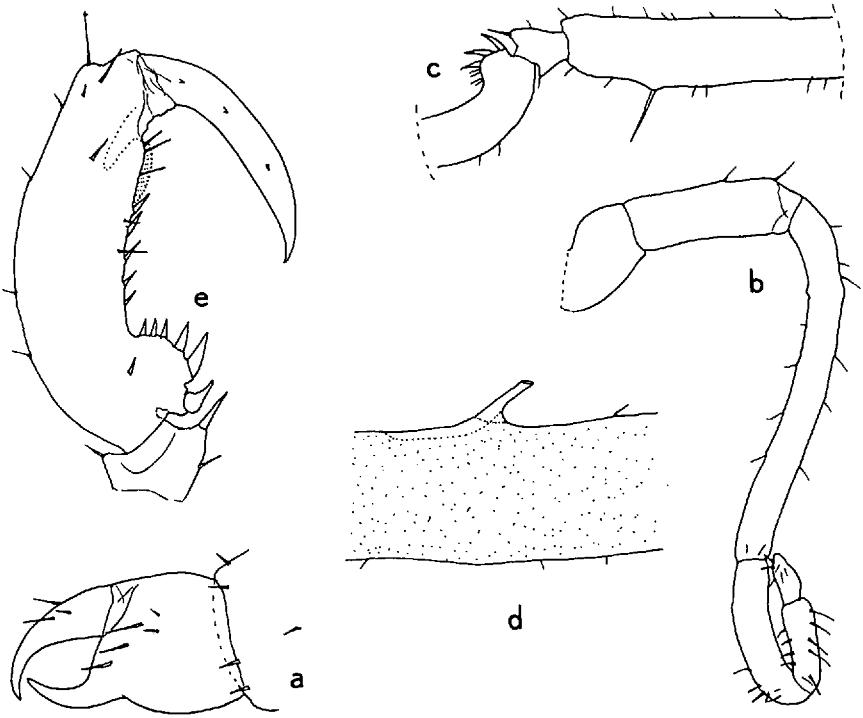

FIGURE 54. *Anoplodactylus maritimus* Hodgson, 1914 (= *A. parvus* Giltay, 1934), ♂. a, chela (scale 10); b, oviger (6); c, distal end of tibia 2 (9); d, cement gland (10); e, distal segments of leg 3 (10). From floating *Sargassum,* 25°N 48°W.

paper a couple of new illustrations of both western Atlantic *A. petiolatus* (figures made after the male from TURSIOPS Sta. 107) and *A. maritimus* (figures made after a male from floating *Sargassum* taken at 25°N 48°W; material recorded by Stock, 1954a, as *A. parvus*).

The following differences prove to be constantly present (cf. Figs. 53 and 54):

Anoplodactylus maritimus (= *parvus*)—propodus shorter and more robust; propodal lamina very short; auxiliary claws vestigial to absent; second oviger segment about 3 times as long as wide; chela with a globular palm, immovable finger short, strongly curved; cement gland duct less than half the femoral diameter; body more compact; subdistal spines on the long segments of the legs about as long as, or shorter than, the diameter of the articles.

Anoplodactylus petiolatus—propodus slender; propodal lamina longer; auxiliary claws small but distinct; second oviger segment about 5 times as long as wide; chelar palm rectangular; immovable finger slender, feebly curved; cement gland duct more than half as long as the femoral diameter; body slender; subdistal spines on the long segments of the legs much longer than the diameter of the articles.

Another taxonomic complication is, that within the animals classified according to the above characters with *Anoplodactylus petiolatus*, one can recognize two types of closely similar, but distinct individuals.

Type A corresponds closely with Lebour's (1945) figures for *A. petiolatus*. The tubercles on the lateral processes are distinct, the lamina is less than half as long as the propodal sole, on the sole there are some 6 or 7 spines proximad of the lamina. Within the present collections, the specimens from the LUYMUS expeditions taken on the coasts of the Guyanas agree closely with this type.

Type B (illustrated in the present paper, Fig. 53, and in Marcus, 1940b, pl. V) has low to vestigial tubercles on the lateral processes, a lamina that is half as long as, or even more than half as long as the sole, whereas some 4 spinules precede the lamina. The TURSIOPS and Hummelinck specimens recorded in the present paper correspond with this type.

A male specimen from LUYMUS O.C.P.S. Exped. Sta. J 111 is intermediate between types A and B. It has very tall tubercles on the crurigers, but only 3 or 4 spines in front of a long propodal lamina.

Like Lebour (1945) I am unable to decide whether one (variable) species, or several closely related species are involved here. For the moment, I have followed Bourdillon (1955: 590) and treated the material as one species.

THE *Anoplodactylus pygmaeus*-COMPLEX

As in the case of the *Anoplodactylus insignis*-complex, a group of closely similar species treated in the preceding pages, a group of sibling species appears to be arranged around *A. pygmaeus* (Hodge, 1864) as well. The interrelationships between these species are, however, less clear to me than those in the *insignis*-complex, chiefly because several of the species involved are not known personally to me, and because several species are known from one, or at most a few, specimens only.

To this *pygmaeus*-complex belong the following small to very small Pycnogonida (this group contains the smallest members of the class known): *A. pygmaeus* (Hodge, 1864) [= *exiguus* (Dohrn, 1881)], *A. brasiliensis* Hedgpeth, 1948, *A. trispinosus* Stock, 1951, *A. micros* Bourdillon, 1955, *A. minutissimus* Stock, 1954, *A. spinirostrum* Stock, 1973, and *A. minusculus* Clark, 1970.

Of these species, *pygmaeus*, *brasiliensis*, *spinirostrum*, and *minusculus* are devoid of auxiliary claws and will not be considered here. The remaining species have rudimentary auxiliary claws; two of them have been recorded from the Caribbean, viz. *trispinosus* and *micros*.

A. trispinosus is known from 3 specimens, found in such widely separated localities as Sénégal, Curaçao, and Ethiopia.

A. micros is known from 2 specimens, collected in Martinique and South Australia.

Fortunately, the present collections contain a larger number of a species that I consider identical with *A. trispinosus*.

Anoplodactylus trispinosus Stock, 1951

Figs. 55, 56a

Anoplodactylus trispinosus Stock, 1951: 14-16, figs. 17-22; Stock, 1954a: 127; Stock, 1954b, fig. 35; Stock, 1964: 31, figs. 8-9 (Curaçao record only).

non *A. trispinosus.*—Stock, 1964: 31, figs. 5-7 (Red Sea record) = *A. turbidus* n. sp., vide infra.

Material.—Curaçao: 6 ♂ ovig. 8 ♂, 4 ♀, 5 juv. St Michiels Bay; from hydroids on algae; abt. 1 m; 15-20-XI-1958; J. H. Stock coll. (ZMA).—1 ♀. St. Michiels Bay; from washings of *Lithophyllum*; 1-2 m; 20-XI-1958; J. H. Stock coll. (ZMA).—Tobago: 1 ♂. Hummelinck Sta. 1385: Buccoo Bay; 2 m; 16-I-1955. (ZMA).

Remarks.—This species was previously already recorded from Curaçao (Stock, 1954a), but both in the original Sénégal record (Stock, 1951), and in the 1954 Curaçao record only females were involved. A single male considered the same species was signalized by Stock, 1964, from the Dahlak Archipelago (Red Sea, Ethiopia).

The present West Indian material contains males and females, and makes it clear that the Red Sea male cannot possibly be identical with the Caribbean material. I have re-examined the Red Sea specimen, and consider it now a new species (vide infra, sub *Anoplodactylus turbidus*).

The chief characteristics of the Curaçao material are: (1) The indistinctly segmented trunk, with knobs on the lateral processes. (2) The shape of the chela, with a feebly curved immovable finger, and a strongly curved movable one. Both fingers are unarmed. (3) The structure of the oviger (segment 2 short and robust, segment 3 fully twice as long as segment 2). (4) The short cement gland duct, placed at about ¾ of the length of the femur.

The Red Sea specimen differs from the Caribbean material in having strong teeth on both fingers of the chela; moreover, both fingers are strongly curved. The cement gland duct is longer and is placed proximad of the

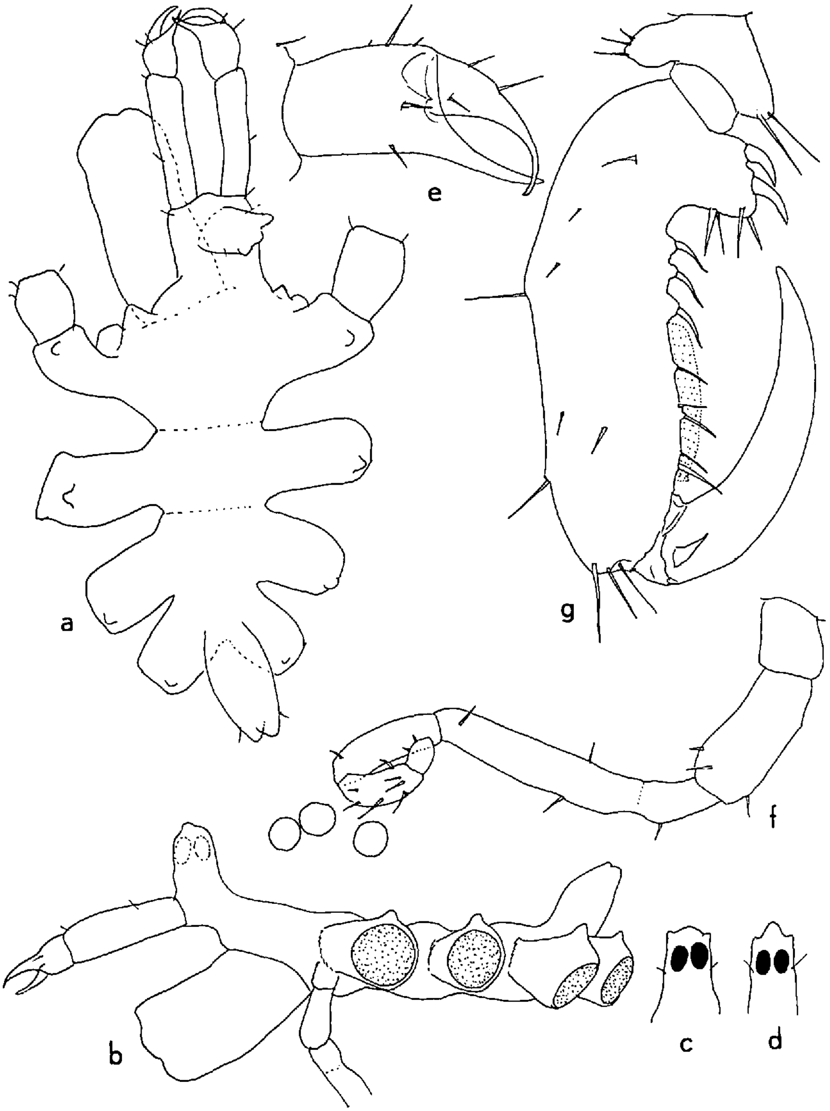

FIGURE 55. *Anoplodactylus trispinosus* Stock, 1951, ♂. a, trunk, dorsal (scale 6); b, trunk, from the left (6); c, d, ocular tubercle of different specimens, frontal (free-hand sketch); e, chela (11); f, oviger (10); g, distal segments of 3rd leg (11). From St. Michiels Bay, Curaçao.

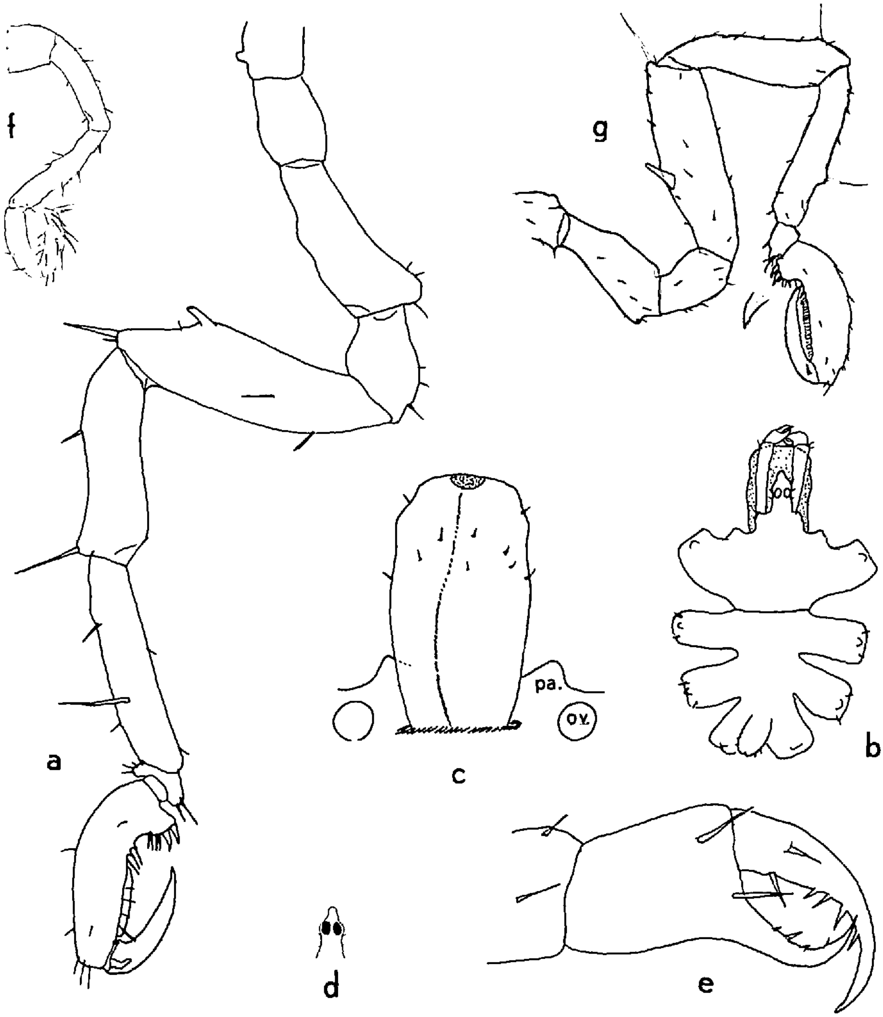

FIGURE 56. a, *Anoplodactylus trispinosus* Stock, 1951, ♂: third leg (scale 6). From St. Michiels Bay, Curaçao. b-g, *Anoplodactylus turbidus* n. sp., holotype ♂. b, trunk, dorsal (scale 12); c, proboscis, ventral (ov. = oviger base; pa. = rudimentary palp) (6); d, ocular tubercle, frontal (free-hand sketch); e, chela (11); f, oviger; g, third leg. From Dahlak Archipelago, Ethiopia. Figs. 52d, f, and g after Stock, 1964.

middle of the femur. Oviger segment 2 is elongated, only a trifle shorter than segment 3.

The Red Sea specimen is in the structure of the oviger and in the position of the cement gland duct similar to *A. micros.* The latter has, however, a very short gland duct, and the fingers of the chela are, but for some minute spinules, devoid of teeth. For these reasons, the Red Sea specimen, previously recorded as *A. trispinosus,* is now considered a distinct species for which the name *A. turbidus* is proposed (vide infra).

One of the Curaçao males measures 738 microns in length (frontal margin neck to tip 4th lateral process), at a maximum width (at the level of the 2nd lateral processes) of 414 microns.

Variability.—Some specimens have only 1 heel spine on the propodus instead of 2. The length of the spinules on the ocular tubercle is variable. There are 2 or 3 spinules in front of the propodal lamina.

Some of the differences between the closely similar species of the *pygmaeus*-complex are recapitulated in Table 1.

A. trispinosus can be distinguished from *A. petiolatus,* another shallow water species abundant in the Caribbean and adjacent areas, by its less slender appendages (e.g., legs, especially the propodus, and oviger segments), and by its shorter cement gland duct.

TABLE 1

SALIENT DIFFERENCES BETWEEN THE SPECIES OF THE *Anoplodactylus pygmaeus*-COMPLEX
(species with rudimentary auxiliary claws only)

	immovable finger	length and position cement gland	rudimentary palp	oviger segments 2 and 3
minutissimus	slightly curved, untoothed	short, proximad of the middle	present	2 = ½ of 3
micros	strongly curved, untoothed	short, almost in the middle	absent	2 slightly shorter than 3, 2 slender
trispinosus	feebly curved, untoothed	short, at ¾	present	2 robust, 2 = ½ of 3
turbidus	strongly curved, toothed	long, proximad of the middle	present	$2 \leqslant 3$, 2 slender

Anoplodactylus turbidus n. sp.

Fig. 56b-g

Anoplodactylus trispinosus Stock, 1964: 31, figs. 5-7 (non *trispinosus* Stock, 1951).

Material.—Ethiopia: 1 ♂ (holotype). Israel South Red Sea Exped. E62/1984c: Condabilu (= island in the Dahlak Archipelago); shallow water, on reefs; 29-III-1962. (ZMA).

Description.—Body rather wide; lateral processes closely together, each armed with a tubercle, processes 2 and 3 moreover with 2 spinules. Only the first intersegmental line is visible on the trunk. Abdomen short. Ocular tubercle rather tall, eyes present.

Proboscis short, clumsy; ventrally provided with some minute spinules.

Chelifore scape thin. Chela with a shorter immovable, and a longer movable finger; both fingers strongly curved; each finger with 4 distinct teeth.

Palp rudiment present.

Oviger with slender 2nd segment, only slightly shorter than segment 3.

Leg as illustrated. Genital process (on P3 and P4 of male) low. Cement gland duct fairly long, situated well in front of the middle of the femur. Two heel spines (distally crenulated) on the propodus; 2 spinules in front of the long lamina; auxiliary claws rudimentary but present.

Derivatio nominis.—The proposed specific name, *turbidus*, means confused.

Measurements of the holotype (♂) in mm are: length trunk (frontal margin neck to tip 4th lateral process), 0.72; width across 2nd lateral processes, 0.51; length proboscis (ventral), 0.31; greatest diameter proboscis, 0.17; and length scape, 0.14.

Measurements of the third leg in mm are: coxa 1, 0.14; coxa 2, 0.27; coxa 3, 0.14; femur, 0.46; tibia 1, 0.36; tibia 2, 0.40; tarsus, 0.05; propodus, 0.31; and claw, 0.20; length cement gland duct (on P3), 0.063.

Anoplodactylus robustus (Dohrn, 1881)

Lit.: see Child & Hedgpeth, 1971: 612-613.

Material.—Florida: 1 young ♂. Hummelinck Sta. 1414: Elliot Key; 2-6 m; 5-IX-1963. (ZMA).—Bonaire: 2 ♀. Hummelinck Sta. 1057a: Kralendijk, near Pasanggrahan; rocky beach; tidal zone; 20-IX-1930. (ZMA).—1 ♂ ovig., 1 ♀. Hummelinck Sta. 1377: Lagoen, N., coast W.; 2-IV-1955. (ZMA).

Remark.—An amphi-atlantic species, also known from the Galapagos Islands.

Anoplodactylus(?) antillianus n. sp.

Fig. 57

Material.—Bonaire: 1 ♀ (holotype). Hummelinck Sta. 1565: Lac, Secu di Sorobon, 100 m N. of Sorobon Point; sandy; *Lithothamnion*-flat; depth 25-100 cm; 21-VIII-1967. (ZMA).

Description.—FEMALE: Robust. Lateral processes separated by intervals that are as wide as, or slightly narrower than, the diameter of the lateral process. No armature on the neck or on the lateral processes. Trunk segments 1 and 2, and 2 and 3, distinctly articulated; segments 3 and 4 fused. Abdomen short. Neck short. Ocular tubercle low and wide, eyes small.

Proboscis barrel-shaped, robust; distal end with slightly angular corners, truncate.

Chelifore scape thin, slender. Chela small; palm unarmed; fingers curved, each finger with 5 small, regular teeth.

No palps.

Oviger 6-segmented. Segment 3 the longest, segment 4 about ⅔ of segment 3; segment 5 about half as long as segment 4, armed with 1 spine; segment 6 about ⅔ of segment 5, unarmed. The specimen is ovigerous and carries two balls with numerous small eggs (egg diameter 27-36 microns).

Legs robust, armed with a few spinules. Femur the longer segment. Coxa 2 with a large genital pore. Cement gland openings not found. Tarsus with a small, dorsal, spine-like projection. Propodal sole with 1 spine and a long lamina, heel with 1 + 2 spines. Auxiliary claws lateral, but fairly strong.

Measurements of the holotype in mm are: length trunk (frontal margin neck to tip 4th lateral process), 0.74; width across 2nd lateral processes, 0.33; length proboscis (ventral), 0.37; greatest diameter proboscis, 0.17; length scape, 0.27; length chela, 0.14.

Measurements of the third leg in mm are: coxa 1, 0.12; coxa 2, 0.19; coxa 3, 0.13; femur, 0.40; tibia 1, 0.32; tibia 2, 0.33; tarsus, 0.04; propodus, 0.27; and claw, 0.21.

Remarks.—The present specimen is functionally a female, judging from the presence of oocytes in the femora, the presence of large genital pores, and the absence of cement gland openings. On the other hand, it possesses an oviger, the presence of which is restricted to the male sex in this genus. There are 3 possible ways of explanation of these facts: (1) the specimen is an intersex; (2) the specimen is a hermaphrodite; (3) the specimen does not belong to *Anoplodactylus*, but to the Pacific genus *Philyra* Losina-Losinsky, 1961*, a genus characterized by having ovigers both in male and in fe-

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* The name *Philyra* is not available for a pycnogonid genus, since it is preoccupied for a leucosiid crab (De Haan, 1833), and for a beetle (Laporte, 1836). Since I do consider Losina-Losinsky's *Philyra* a valid genus within the family Phoxichilidiidae, the new name PHOXIPHILYRA is proposed for it (type-species *Philyra robusta* Los.-Los., 1961).

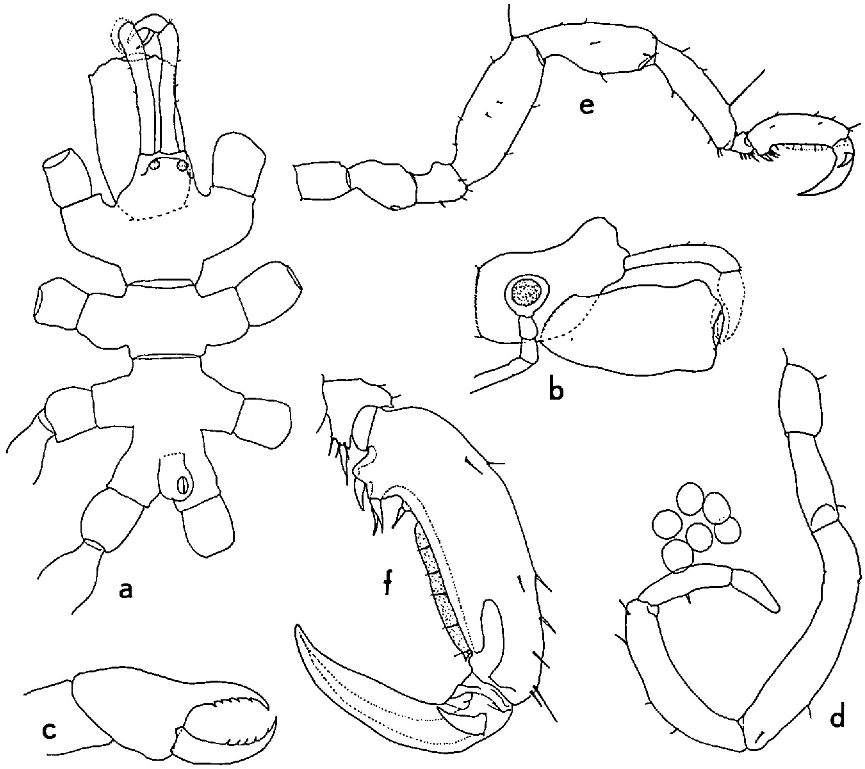

FIGURE 57. *Anoplodactylus antillianus* n. sp., holotype (hermaphrodite ?). a, trunk, dorsal (scale 28); b, cephalic segment, from the right (28); c, chela (31); d, oviger (32); e, third leg (33); f, distal segments of 3rd leg (32). From Hummelinck Sta. 1565.

male. The ♀ oviger structure is, however, different from that found in the present specimen from Bonaire, so I have preferred to classify my material provisionally with *Anoplodactylus.*

Unfortunately, the male of this new species remains unknown at present, if the species is not a hermaphrodite.

Anoplodactylus antillianus is characterized by its long propodal lamina, strong auxiliary claws, finely toothed chelar fingers, angular proboscis, short neck, well-spaced crurigers, long 4th oviger segment, etc.

Anoplodactylus batangensis (Helfer, 1938)
Fig. 43c-d

Anoplodactylus batangensis.—Stock, 1968: 54 (lit., syn.); Arnaud, 1973: 957, figs. 3-4.

Material.—Florida: 1 ♂. Hummelinck Sta. 1410: Key Biscayne, North Point; *Thalassia*; 1-IX-1963. (ZMA).—Antigua: 1 ♀. Hummelinck Sta. 1393: Deep Bay at Fort Barrington; 17-VII-1955. (ZMA).—1 ♀. Hummelinck Sta. 1540B: Dickinson Bay, N.; eroded *Thalassia* flat; ½-1 m; 26-VII-1967. (ZMA).—Curaçao: 1 ♂. Hummelinck Sta. 1620: Piscadera Bay, outer bay; piling (iron and wooden poles); 0-1 m; 14-X-1967. (ZMA).—Venezuela: 1 ♂ ovig. Hummelinck Sta. 1215: La Pecha (Los Frailes); rock debris, sand; 1-2 m; 19-VI-1936. (ZMA).

Remarks.—Like Bourdillon's (1955) and Arnaud's (1973) samples, the present material has well-pigmented eyes. Males of this species are apparently rather rare. Illustrations of the oviger and of the cement gland duct of a male collected at Key Biscayne are incorporated in this report.

Anoplodactylus sp.

Material.—Barbuda: 1 ♀. Hummelinck Sta. 1394: Martello Tower beach; 8-VII-1955. (ZMA).—St. Kitts: 1 ♀. Hummelinck Sta. 1397: Frigate Bay, S.E.; 20-VII-1955. (ZMA).—Curaçao: 1 ♀. Hummelinck Sta. 1629: Spaanse Water, N., Jan Sofat, islet; *Rhizophora*; rocky; 17-XI-1968. (ZMA).—Klein Curaçao: 2 juv. South coast near fishing shacks; from hydroids on brown algae; depth abt. 1.5 m; 16-XI-1958; J. H. Stock coll. (ZMA).

Remarks.—Solitary females or juveniles are hard to identify in this large genus.

Anoplodactylus (Labidodactylus) evelinae Marcus, 1940

Anoplodactylus evelinae Marcus, 1940b: 55-58, fig. 4; Hedgpeth, 1948: 232, fig. 31.
Anoplodactylus (Labidodactylus) evelinae.—Stock, 1954a: 128.

Material.—St. Kitts: 1 ♀, 1 juv. Hummelinck Sta. 1398: W. of Basseterre; 30-VI-1955. (ZMA).

Remark.—A rare, possibly psammophilous, species known from the tropical western Atlantic only.

Endeis mollis (Carpenter, 1904)

Endeis mollis.—Bourdillon, 1954b: 4 (refs.).

Material.—Nigeria: 1 ♂ ovig., 1 ♀. PILLSBURY Sta. 248: 04°03′N 05°41′E-04°07′N 05°40′E; 33 m; 13-V-1965. (ZMA).—Canal Zone: 2 ♂ (one of which ovigerous), 1 ♀, 1 juv. PILLSBURY Sta. 323: Christobal, pilings of pier 9/10; dip net; 6-VII-1966. (UMML).—Surinam: 1 ♀. SNELLIUS O.C.P.S. Sta. H 52: 06°50.3′N 56°59.2′W; 39 m; 9-V-1966. (RMNH).—1 ♂. SNELLIUS O.C.P.S. Sta. F 6: 06°26.6′N 56°33.0′W; 33 m; 12-IV-

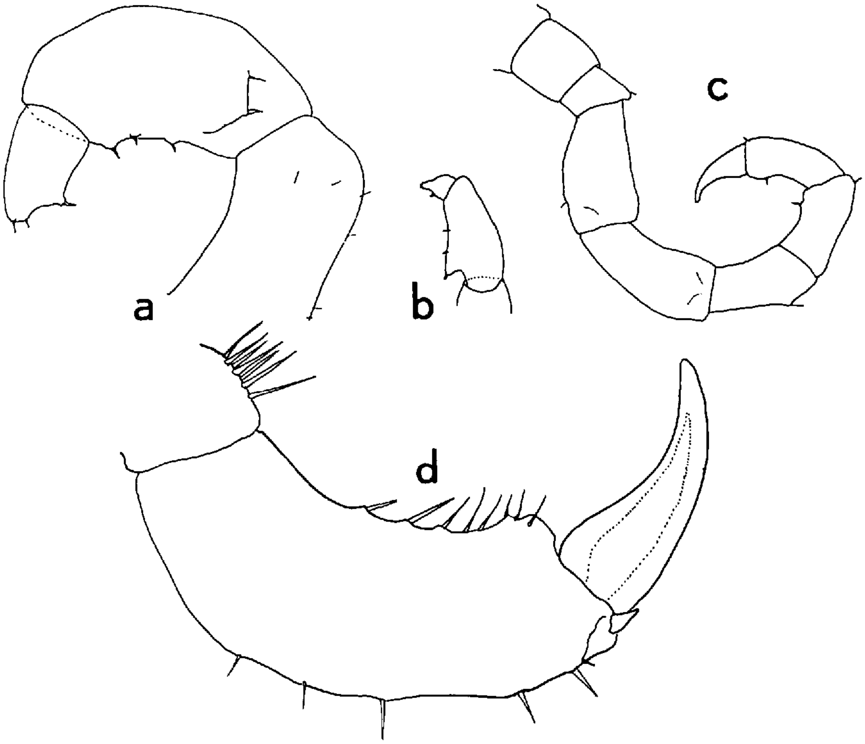

FIGURE 58. a-b, *Endeis flaccida* Calman, 1923, ♂. a, distal portion of oviger (scale 6); b, same, seen from a different (more ventral) angle (free-hand sketch). From Bear Cut, Miami. c, *Pentapycnon geayi* Bouvier, 1911, ♂: oviger (scale 12). From SALDANHA Sta. 1763. d, *Pycnogonum cessaci* Bouvier, 1911, ♂: distal segments of 2nd leg (scale 34). From Hummelinck Sta. 1215.

1966. (RMNH).—1 ♂ ovig. LUYMUS O.C.P.S. II Sta. M 86: 06°36.2′N 54°00.1′W; 42 m; 11-IV-1969. (RMNH).—Brazil: 1 ♂. SALDANHA Sta. 1783A: 03°22.0′N 48°55.0′W; 105 m; 16-XI-1967. (ZMA).—4 ♂, 2 ♀. SALDANHA Sta. 1773A: 02°28.0′N 48°13.5′W; 85 m; 14-XI-1967. (ZMA).—1 ♂. SALDANHA Sta. 1767: 01°32.5′N 47°24.5′W; 63 m; 13-XI-1967. (ZMA).—1 ♂. CANOPUS Sta. 57: 03°07′S 38°27′W; 72 m; 25-VIII-1965. (ZMA).—1 ♂ ovig. CANOPUS Sta. 41: 04°27′S 37°04′W; 58 m; 23-VIII-1965. (ZMA).—1 ♀. AKAROA Sta. 73: 10°02′45″S 35° 43′00″W; 90 m; 5-IX-1965. (ZMA).

Remarks.—Stock (1957: 85) recorded this species from the same general area as the PILLSBURY Sta. 323 record. This is a circum-tropical species from relatively shallow waters.

The number of cement gland pores in the present specimens ranges from 21 to 25, in one case up to 35.

Endeis flaccida Calman, 1923
Fig. 58a-b

Endeis flaccida.—Stock, 1970: 3-4 (refs.).

Material.—Florida: 1 ♂, 1 ♀. Channel between Virginia Key and Key Biscayne; no date. (UMML).—1 ♂ juv. From grassflat in front of Marine Lab., Virginia Key, Biscayne Bay; 2-II-1959. (UMML).—1 ♀. Bear Cut, Virginia Key; on *Thalassia*; 0-1 m; 23-XII-1964; L. B. Holthuis coll. (RMNH).—1 ♀. Same loc., 15-IX-1960. (RMNH).—1 ♂, 1 ♀. Same loc.; 0-1½ m; 2-4-IX-1963. (RMNH).—1 ♀. Same loc.; 0-1 m; 23-XII-1964. (RMNH).—7 juv. Hummelinck Sta. 1409: Virginia Key, Marine Laboratory piling; 1-IX-1963. (ZMA).

Remarks.—Several specimens of this species, previously known from the Indo-West Pacific region only, have been collected in very shallow waters in the vicinity of the University of Miami Marine Laboratory.

The penultimate segment of the male oviger bears a proximo-internal protuberance, which may be a characteristic for this species (Fig. 58a-b).

Family Pycnogonidae

Pycnogonum reticulatum Hedgpeth, 1948

Pycnogonum reticulatum Hedgpeth, 1948: 279-281, fig. 52c-f; Hedgpeth, 1954: 427; Stock, 1954a: 129; Stock, 1968, fig. 22j.

Pycnogonum sp.—Hedgpeth, 1947: 13, fig. 5c.

Material.—Florida: 4 ♀. Soldier Key; 7-VIII-1963; G. Hendrix coll. (UMML).—1 ♂. Ragged Keys; on sponge; depth 5 ft; 11-X-1958. (ZMA).—Many specimens. Pigeon Key; on coral; 30-I-1965; L. B. Holthuis coll. (RMNH).—Aruba: 1 ♀. Hummelinck Sta. 1301: Malmok, Arasji; 14-VIII-1955. (ZMA).

Remarks.—The present material has a distally rounded abdomen, like illustrated by Hedgpeth, 1947, 1948, and unlike the specimen recorded (Stock, 1954a) and illustrated (Stock, 1968, fig. 22j) from Islote Aves, W. of Dominica. Possibly more than one species is involved.

Pycnogonum cessaci Bouvier, 1911
Fig. 58d

Pycnogonum cessaci Bouvier, 1911: 493; Fage, 1952c: 531, 1 fig. (lit., syn.); Stock, 1954a: 129; Stock, 1966: 400 (in key); McCloskey, 1967: 131-133, figs. 25-27.

Pycnogonum pamphorum Marcus, 1940b: 115-117, fig. 16.

Pycnogonum leticiae de Mello-Leitão, 1945: 1-4, figs. 1-5.

Material.—Venezuela: 2 ♂, 1 ♀. Hummelinck Sta. 1215: La Pecha (Los Frailes); rock debris, sand; 1-2 m; 19-VI-1936. (ZMA).

Remarks.—An amphi-atlantic species. It has, as I briefly mentioned in my 1954a paper, vestigial auxiliary claws (Fig. 58d).

Pycnogonum guyanae n. sp.

Fig. 59a-e

Material.—French Guiana: 1 ♀ (holotype). LUYMUS Guyana Shelf Exped. Sta. 1: 07°10'N 53°35'W; 130-104 m; sandy calcarenite; from Gorgonaria; 24-VIII-1970. (RMNH).

Description.—Trunk with 3 middorsal tubercles, each tubercle with several knobs or rugosities. Every lateral process with a distal tubercle; slightly lower than the middorsal ones, but also knobby. A low knobby elevation occurs also at the distal end of the abdomen. Ocular tubercle robust, low, obtuse; eyes present. Lateral processes distinctly separated by a narrow interval.

Proboscis more or less cylindrical, distally rounded.

Coxae without prominent knobs. Femur with a marked dorsal swelling, which is slightly knobby, and with a strong proximoventral hump. Tibiae 1 and 2 progressively shorter; tibia 2 only twice as long as wide. Each of the long leg segments with a subdistal seta. Tibia 2 with a distoventral field of small spinules. This group of spinules continues on the ventral margin of the tarsus and on the propodal sole; the latter bears about 16 spinules, in a rather loose setting (P3). Claw strong; no auxiliary claws. Genital pores on the dorsal surface of coxa 2 of legs 3 and 4.

Remarks.—Using Stock's key (1966) to the species of the Pycnogonidae, the present form can be followed down to couplet 33, where it keys out with *Pycnogonum anovigerum* Clark, 1956 and *P. crassirostrum* Sars, 1888. From the former, a species from New Zealand, it differs clearly, e.g. by the shortened femur and tibiae of *anovigerum.* The present tropical specimen is surprisingly close, however, to *P. crassirostrum,* a northern hemisphere cold-water species with a bathymetrical range of 50-200 fathoms.

I have compared the present material with a specimen of *P. crassirostrum* collected at 63°29.3'N 52°36.4'W, 300 m, and found the following, admittedly slight, differences: (1) a mid-dorsal tubercle is present on trunk segment 4 in *crassirostrum,* absent in *guyanae*; (2) the dorsal trunk tubercles are smooth in *crassirostrum,* knobby in *guyanae*; (3) the femur forms dorsally a regular curve in *crassirostrum,* but bears a dorsal swelling in *guyanae*; (4) tibia 2 is more than twice as long as wide in *crassirostrum,* about twice as long as wide in *guyanae*; (5) the propodus bears about 50

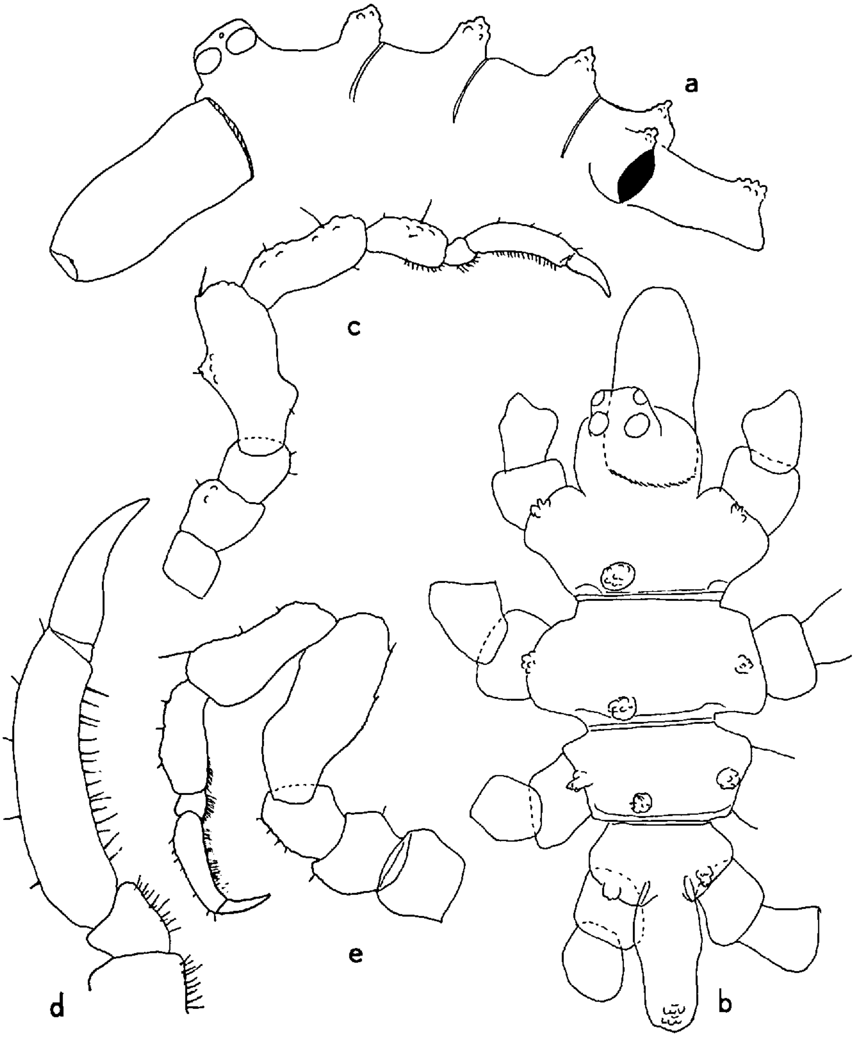

FIGURE 59. a-d, *Pycnogonum guyanae* n. sp., holotype ♀. a, contour of dorsum, from the left (scale 1); b, trunk, dorsal (1); c, third leg (1); d, distal segments of 3rd leg (6). From LUYMUS Guyana Shelf Exped. Sta. 1. e, *Pycnogonum crassirostrum* G. O. Sars, 1888, ♂: third leg (scale 2). From NOR-ATLANTE Sta. 36.

densely packed spinules on the sole in *crassirostrum*, about 16 loosely set spinules in *guyanae*; (6) *P. guyanae* is much smaller.

For purposes of comparison, the third leg of *P. crassirostrum* is re-illustrated in the present paper (Fig. 59e).

Measurements of the holotype (♀) in mm are: trunk segment 1 (from anterior margin of cephalic segment), 0.63; trunk segment 2, 0.43; trunk segment 3, 0.43; trunk segment 4 (to tip of abdomen), 0.76; width across 2nd lateral processes, 0.78; length proboscis (ventral), 0.78; and basal (= greatest) diameter of proboscis, 0.35.

Measurements of the third leg in mm are: coxa 1, 0.20; coxa 2, 0.23; coxa 3, 0.18; femur, 0.60; tibia 1, 0.48; tibia 2, 0.31; tarsus, 0.08; propodus, 0.38; and claw, 0.21.

Pentapycnon geayi Bouvier, 1911
Fig. 58c

Pentapycnon geayi.—Hedgpeth, 1948: 281 (refs.); Hedgpeth, 1947: 13: fig. 5d.

Material.—Surinam: 1 ♀. Bigisanti, near Wiawia Bank, W. of the mouth of the Marowijne river; II-IV-1969; L. P. Schulz coll. (RMNH). 1 ♀. LUYMUS O.C.P.S. II Sta. M 81: 05°59.4'N 54°04.4'W; 8 m; 10-IV-1969. (RMNH).—Brazil: 1 ♀. SALDANHA Sta. 1891: 01°33.0'N 48°28.0'W; 24 m; 1-V-1968. (ZMA).—3 ♂. SALDANHA Sta. 1763: 00°25.0'S 47° 17.0'W; 23 m; 8-XI-1967. (ZMA).—1 ♀. SALDANHA Sta. 1655: 06° 04.7'S 34°59.0'W; 25 m; 7-X-1967. (ZMA).

Remarks.—The 4 dorsal trunk tubercles are not quite as tall as in the specimen illustrated by Hedgpeth, 1948.

It is interesting to note that the female genital apertures are situated on the dorsal surface of coxa 2 of legs 2 through 5, but that they are apparently absent on leg 1. This is in contradistinction to Bouvier's statement (1913: 164) that they are present on leg 5 only.

The male genital pores are, as far as I could ascertain, present on the ventral surface of coxa 2 of leg 5 only. The male oviger is, as noted before (Bouvier, 1913), 7-segmented, with a strong terminal claw (Fig. 58c).

This extra-legged form was previously recorded from the vicinity of Cayenne, in French Guiana, and from N. of Puerto Rico. The present records extend its range to off Recife, Brazil.

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APPENDIX

Key to the scales used in the figures

Scale 1— 3.7 cm in the drawings is 1000 μm actually
Scale 2— 3.7 cm = 2000 μm
Scale 3— 2.6 cm = 2000 μm
Scale 4— 5.0 cm = 20 mm
Scale 5— 5.1 cm = 2000 μm
Scale 6— 9.6 cm = 1000 μm
Scale 7—10.0 cm = 20 mm
Scale 8— 8.8 cm = 200 μm
Scale 9— 3.0 cm = 400 μm
Scale 10— 5.6 cm = 400 μm
Scale 11— 5.6 cm = 200 μm
Scale 12— 9.6 cm = 2000 μm
Scale 13— 5.6 cm = 100 μm
Scale 14— 5.5 cm = 4000 μm
Scale 15— 3.6 cm = 2000 μm
Scale 16— 2.1 cm = 2000 μm
Scale 17— 1.9 cm = 3000 μm
Scale 18— 7.4 cm = 3000 μm
Scale 19— 5.9 cm = 2000 μm
Scale 20— 2.1 cm = 3000 μm
Scale 21— 5.9 cm = 3000 μm
Scale 22— 2.6 cm = 3000 μm
Scale 23— 5.1 cm = 3000 μm
Scale 24— 3.7 cm = 3000 μm
Scale 25— 9.6 cm = 3000 μm
Scale 26— 3.9 cm = 10 mm
Scale 27— 3.2 cm = 10 mm
Scale 28— 6.4 cm = 1000 μm
Scale 29— 5.0 cm = 6 mm
Scale 30— 5.0 cm = 4 mm
Scale 31— 5.6 cm = 300 μm
Scale 32— 4.5 cm = 300 μm
Scale 33— 3.0 cm = 600 μm
Scale 34— 4.5 cm = 200 μm
Scale 35— 2.8 cm = 300 μm
Scale 36— 3.7 cm = 100 μm
Scale 37— 5.0 cm = 10 mm